i8094A & i-8094H Getting Started

(Version 1.3)

PAC WinCon-8000 Series Controllers

(Applied to: i8094A & i8094H)

ICP DAS CO., LTD.

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1 Introduction of i8094A/i8094H Motion Control Module

1.1 i8094A/i8094H Introduction

i8094A/i8094H is a motor motion control module with built-in CPU, DPRAM, FRAM and SRAM; it is integrated axis control module that support 4-axis stepper/servo motor motion control; the maximum output Pluse could reach 4M PPS, this module could be applied to ICP DAS WinCon-8000 controllers. I8094A/i8094H motor motion control module is good for motion control applications for general purposes; it provides a lot of motion control features that offers customers easy-to-use and intuitive solutions. These features include: 2/32~3-axes linear interpolation, 2-axes circular interpolation, T/S-curve acceleration/ deceleration, various synchronous actions, automatic homing, and many others.

In addition, i8094H equips with built-in ICP DAS's unique FRnet distributed DI/DO control functions, it could connect externally to 128 DI and 128 DO control points; each with cycle time of 0.74ms. Moreover, when i8094A/i8094H performs functions above, it does not consume WinCon system resources. The CPU could monitor other status at the same time. It require very little system resources, therefore one WinCon-8000 could insert with a couple of i8094A/i8094H modules, to perform control of multi-axis (4,8 ....) motion Control on the same controller.

Besides, this module has a few built-in hardware like CPU, etc, therefore supports a series of macro programming functions. It provides customers multiple sets of macro programming functions, hence will reduce programming effort and enable programmers to develop programs more flexibly. ICP DAS also provides a wide range of demo programs and macro programming functions sets to eliminate programming tasks; making it a highly cost-effective motion control system designed platform.

1.2 Hardware Specification

1.2.1 Main Specification

ASIC Chip	**MCX314As**
CPU	**80186**
FRAM	**128KB**
SRAM	**512KB**
EEPROM	**512KB**
Number of controllable	**4-Axes, Pulse output (stepping & servo motor)**
Up to 4M PPS pulse output	**4 M PPS**

1.2.2 Interpolation Function

2-axes & 3-axes linear interpolation

Interpolation range	−2,147,483,646 ~ +2,147,483,646
Vectors speed of interpolation	1 PPS ~ 4M PPS
Precision of interpolation	± 0.5 LSB

Circular interpolation

Interpolation range	−2,147,483,646 ~ +2,147,483,646
Vectors Speed of interpolation	1 PPS ~ 4M PPS

Relative interpolation function

- Any 2-axes or 3-axes interpolation
- Fixed vectors speed
- Continuous interpolation

1.2.3 Pulse Output

Output speed range	1 PPS ~ 4 MPPS
Output precision	± 0.1%
Jerk range of S-curve	954 ~ 62.5 x 10^6 PPS/S^2 477 x 10^3 ~ 31.25 x 10^9 PPS/S^2
Acceleration/deceleration range	125 ~ 1 x 10^6 PPS/S 62.5×10^3 ~ 500 x 10^6 PPS/S
Speed precision	1 PPS ~ 500PPS(Depends on the max. speed)

- Output numbers 0 ~ 4,294,967,295 / unlimited
- Velocity profiles mode:
    - Fixed
    - Symmetrical & Asymmetrical Trapezoidal velocity profile
    - Symmetrical & Asymmetrical S-curve velocity profile

- Acceleration & Deceleration mode
    - Auto
    - By user define

- Position & Speed change on the fly
- Fixed pulse output by Trapezoidal and S-curve velocity profile
- Pulse output option: CW/CCW, PULSE/DIR
- Programmable logic level （Rising Edge/ Falling Edge）

1.2.4 Encoder Input

- Encoder option: A/B phase, Up/Down
- Programmable A/B phase mode: 1, 1/2, and 1/4 A/B phase

1.2.5 Position counter

- Command counter range −2,147,483,648 ~ +2,147,483,647
- Encoder counter range −2,147,483,648 ~ +2,147,483,647
- Programmable ring counter
- Programmable direction of counter
- Using DI(IN3) to Clear feedback counter
- Programmable read & write counter

1.2.6 Auto-Homing

- Four Steps
    - Step 1 (High-speed ”Near Home” searching)
    - Step 2 (Low-speed ”Home” searching)
    - Step 3 (Low-speed Index Z searching)
    - Step 4 (High-speed offset drive)

By software functions, each step enables user to configure actions and directions, therefore, offers user more than 10 homing modes to choose from.

1.2.7 Servo Motor Input Signal

- Alarm
- IN2 options: In Position or Servo Ready signal
- Input signal options: Enable/Disable and logical level.

1.2.8 Limit Switch Input Signal

- Two-limit switch signal for each axis: +Limit, −Limit
- Programmable logic level
- Programmable action mode(slow-down stop or immediately stop)

1.2.9 Other Input Signals

- IN3 : could be used for other applications; for example: as a trigger of synchronal control, etc.

1.2.10 Emergency Stop Signal Input

- There is an Emergency stop signal for Each module.

1.2.11 General Output Signal

- The Servo-on signal (nOUT1) can be used as servo-on control or general purpose output signal for each axis.

1.2.12 Integral Input Signal Filters

- The motion module is equipped with an integral type filter in the input step of each input signal. User can be selected a filter time constant.

1.2.13 Software Limit

- There are two software-limit for each axis: -SLimit & + SLimit (Setting range : −2,147,483,646 ~ +2,147,483,646)

1.2.14 Manual Pulse Generator

- Fixed Pulse Driving Mode (CW/CCW pulse mode)
- Continuous Pulse Driving Mode (CW/CCW pulse mode)
- Manual pulsar mode(A/B phase pulse mode)

1.2.15 Module status LED Indicators

- Red LED → Power Indicator (will turn on when power is on)
- Orange LED → Servo Alarm Indicator

  Ex: Misuibishi driver, No Alm: Orange LED will turn on.
- Green LED → Running Motion Indicator (will turn on when under Running Motion)

1.2.16 Compare Trigger Output

- **For X-axis and Y-axis only**
- **Output mode: 5V TTL**

1.2.16 FRnet (i8094F only)

- DI → up to 128 connecting points
- DO → up to 128 connecting points

1.3 Environment

- Operating Temp: -20 ~ + 75°C
- Storage Temp: -30 ~ +85°C
- Operating Humidity: 10 ~ 85%，non-condensing
- Storage Humidity: 5 ~ 90%，non-condensing
- I/O optically isolated 2500Vrms
- External Power supply(Input): 24V DC (connect to terminal board)

1.4 Ordering Information

- **W-8x31-GM1 PAC controllers**
- **i8094A/i8094H 4-axes motion control module**
- **DN-8468GB i8094A/i8094H interface board**
- **DN-8468DB i8094A/i8094H interface board**
- **DN-8468MB i8094A/i8094H interface board**
- **DN-8468PB i8094A/i8094H interface board**
- **DN-8468YB i8094A/i8094H interface board**
- **CA-SCSI15 68-pin SCSI-II cable, length: 1.5 m**
- **CA-SCSI30 68-pin SCSI-II cable, length:3 m**
- **CA-SCSI50 68-pin SCSI-II cable, length:5 m**

2 HARDWARE INSTALLATION

2.1 i8094A/i8094H Check Package & Installation

2.1.1 Check Package

i8094A/i8094H is a 4-axes stepping/servo motor control module; you will need a WinCON-8000 series PAC to serve as the controller.

You will need:

- **W-8x31-GM1 PAC controller**

You will also need the following items to implement installation of i8094A/i8094H modules:

■ **i8094A/i8094H**	**4-axes motion control module**
■ **DN-8468 series**	**i8094A/i8094H interface board**
■ **CA-SCSI15**	**68-pin SCSI-II cable, length: 1.5 m**

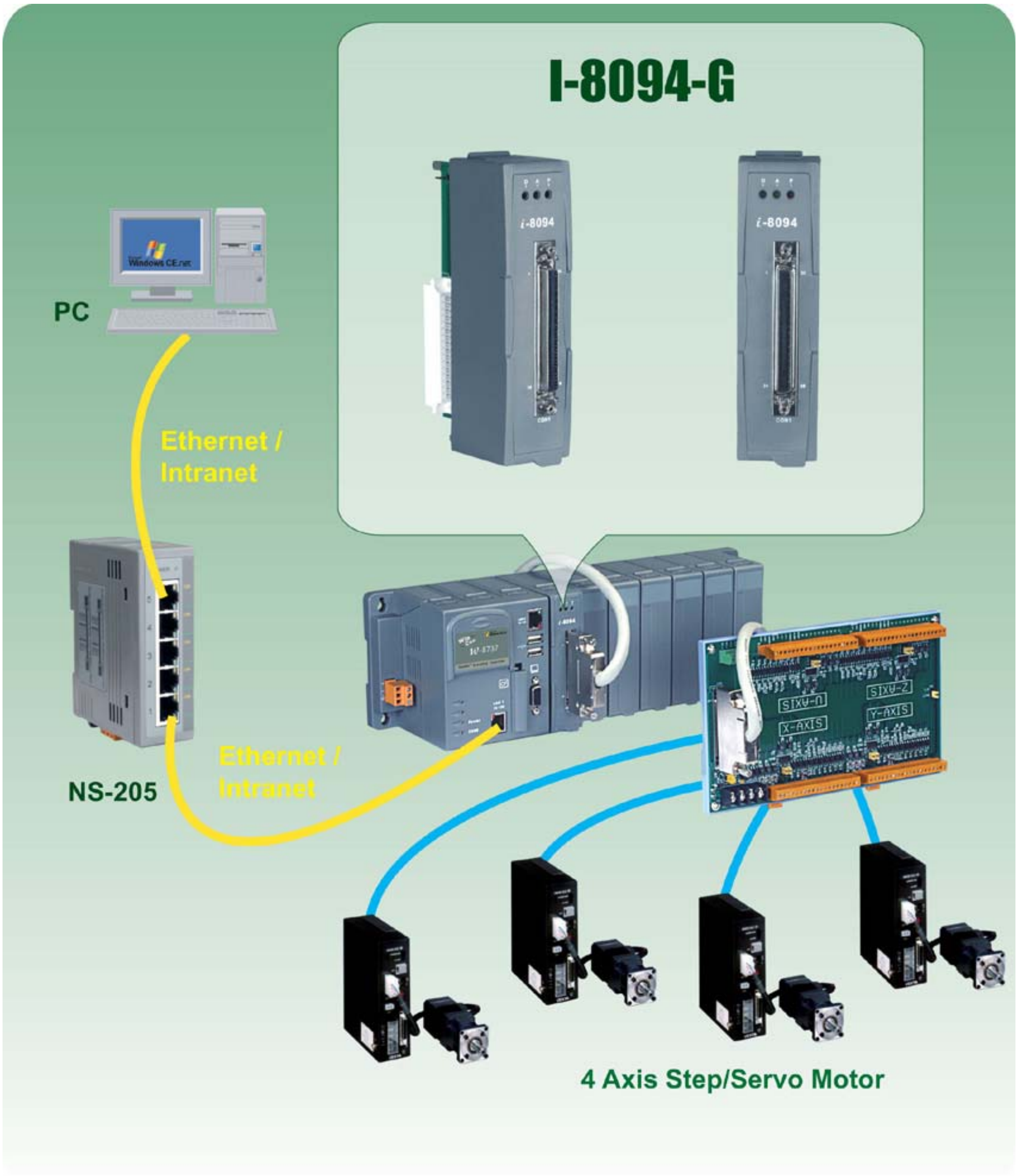
2.1.2 i8094A/i8094H Installation

Before Installation

1. You will need a ICP DAS (W-8000series) PAC controller with I/O expansion slot (currently we offer a variety of 3- or 7- slot)
2. Turn off the power.

Modules Installation & Wiring

1. Position the i8094/i8094F module over the I/O Expansion Slot, aligning the module card with the groove at the side of the Expansion Slot.
2. Insert the module into the I/O Expansion Slot, glide the module card along the groove; press down the module until it is completely seated on the Expansion Slot.
3. Secure the module by push down the “LOCK” latch.
4. Connect the i8094/i8094F with DN-8468G by a CA-SCSI15 cable, as the below figure:


I-8094-G
i-8094
i-8094
PC
Windows CE.net
Ethernet / Intranet
NS-205
Ethernet / Intranet
X-AXIS
Y-AXIS
Z-AXIS
U-AXIS
4 Axis Step/Servo Motor

[此圖要修正為I-8094A/H]

2.2 DN-8468GB Terminal Board

2.2.1 DN-8468GB Board Layout

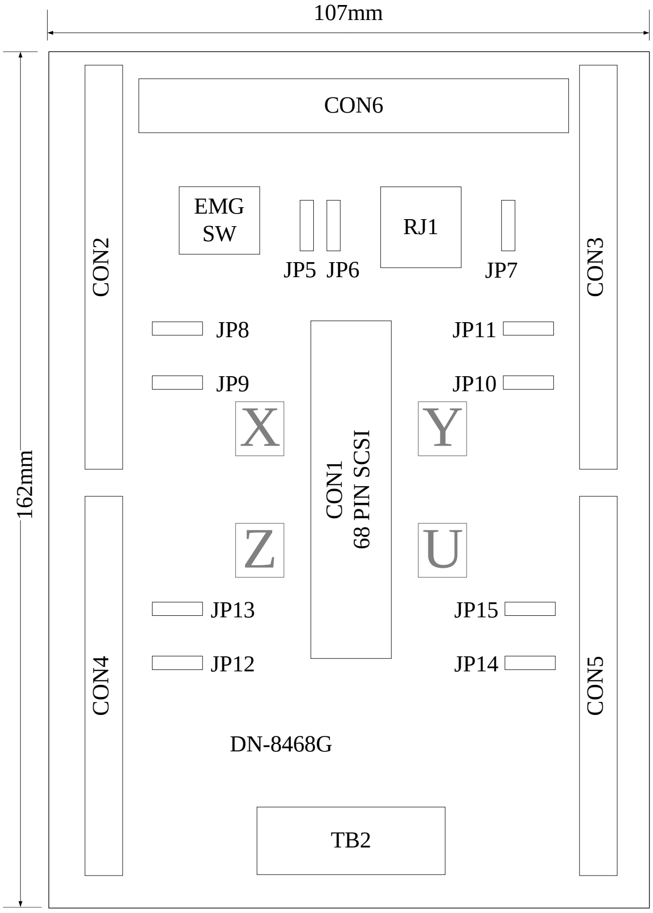

107mm
162mm
CON6
EMG
SW
JP5
JP6
RJ1
JP7
CON2
CON3
JP8
JP9
JP11
JP10
X
Y
CON1
68 PIN SCSI
Z
U
JP13
JP12
JP15
JP14
CON4
CON5
DN-8468G
TB2

Fig. 2.0 DN-8468G Board layout

2.2.2 Pin Assignment

- **CON1**

68-pin **SCSI II Pin Assignment (connector to connect modules and wiring terminal board**)

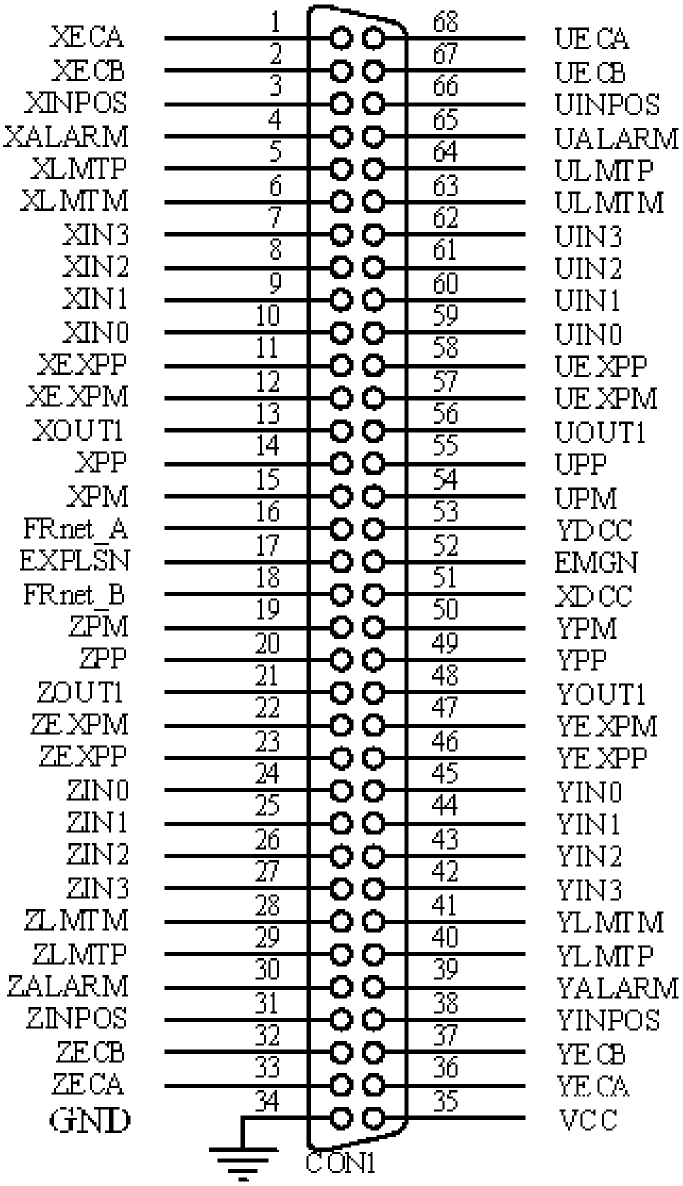

XECA 1 68 UECA
XECB 2 67 UECB
XINPOS 3 66 UINPOS
XALARM 4 65 UALARM
XLMTP 5 64 ULMTP
XLMTM 6 63 ULMTM
XIN3 7 62 UIN3
XIN2 8 61 UIN2
XIN1 9 60 UIN1
XIN0 10 59 UIN0
XEXPP 11 58 UEXPP
XEXPM 12 57 UEXPM
XOUT1 13 56 UOUT1
XPP 14 55 UPP
XPM 15 54 UPM
FRnet_A 16 53 YDCC
EXPLSN 17 52 EMGN
FRnet_B 18 51 XDCC
ZPM 19 50 YPM
ZPP 20 49 YPP
ZOUT1 21 48 YOUT1
ZEXPM 22 47 YEXPM
ZEXPP 23 46 YEXPP
ZIN0 24 45 YIN0
ZIN1 25 44 YIN1
ZIN2 26 43 YIN2
ZIN3 27 42 YIN3
ZLMTM 28 41 YLMTM
ZLMTP 29 40 YLMTP
ZALARM 30 39 YALARM
ZINPOS 31 38 YINPOS
ZECB 32 37 YECB
ZECA 33 36 YECA
GND 34 35 VCC
CON1

Fig. 2.1 CON1 I/O connector pin assignment

Table 2.1 DN-8468G I/O connector signal description (part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTP	5	Limit switch input signal (+) for X axis
YLMTP	40	Limit switch input signal (+) for Y axis
ZLMTP	29	Limit switch input signal (+) for Z axis
ULMTP	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

Table 2.2 DN-8468G I/O connector signal description (part 2)

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FrnetA	16	FRnet port A
FrnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

■ CON2 ~ CON5 (AXIS X、Y、Z、U I/O connector Wiring information)

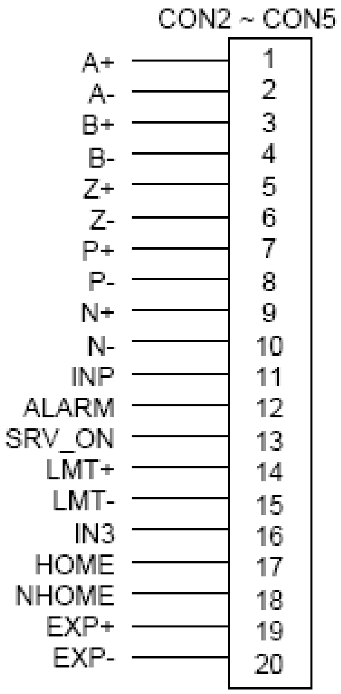

CON2 ~ CON5
A+ 1
A- 2
B+ 3
B- 4
Z+ 5
Z- 6
P+ 7
P- 8
N+ 9
N- 10
INP 11
ALARM 12
SRV_ON 13
LMT+ 14
LMT- 15
IN3 16
HOME 17
NHOME 18
EXP+ 19
EXP- 20

Fig. 2.2 Pin definition for CON2 ~ CON5

Table 2.3 CON2 ~ CON5 Signal Connection

Name	Number	Description
A+	1	Encoder A-Phase (+)
A-	2	Encoder A-Phase (-)
B+	3	Encoder B-Phase (+)
B-	4	Encoder B-Phase (-)
Z+	5	Encoder Z-Phase (+)
Z-	6	Encoder Z-Phase (-)
P+	7	Positive Direction Pulse Output(+)
P-	8	Positive Direction Pulse Output(-)
N+	9	Negative Direction Pulse Output(+)
N-	10	Negative Direction Pulse Output(-)
INP	11	Servo In Position
ALARM	12	Servo Alarm
SRV_ON	13	Servo On
LMT+	14	END Limit Signal (EL+)
LMT-	15	END Limit Signal (EL-)
IN3	16	Input Signal (IN3)
HOME	17	Home Sensor Input Signal
NHOME	18	Near Home Sensor Input Signal
EXP+	19	EXT Positive Direction Pulse (+)
EXP-	20	EXT Negative Direction Pulse (-)

- The connector CON6 is 16-pin connector for you to connect to the RDY & EMG signals, external Pulse input, and FRnet connectors (i8094H only) of the motor drivers, enables to connect with external DI/DO modules, etc.. FRnet(i8094HF)connectors could connect to FRnet series IO modules, such as FR-2053, FR-2057, etc. For more information, please go to website: **http://www.icpdas.com/products/Remote_IO/frnet/frnet_introduction.htm**

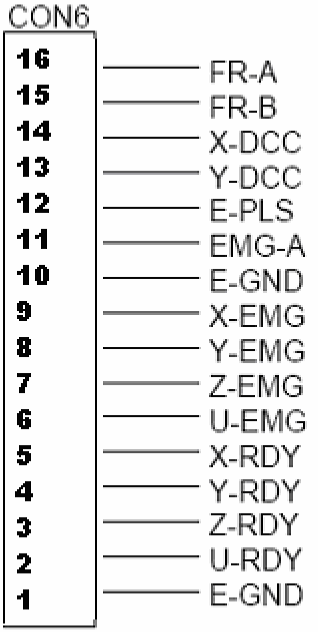
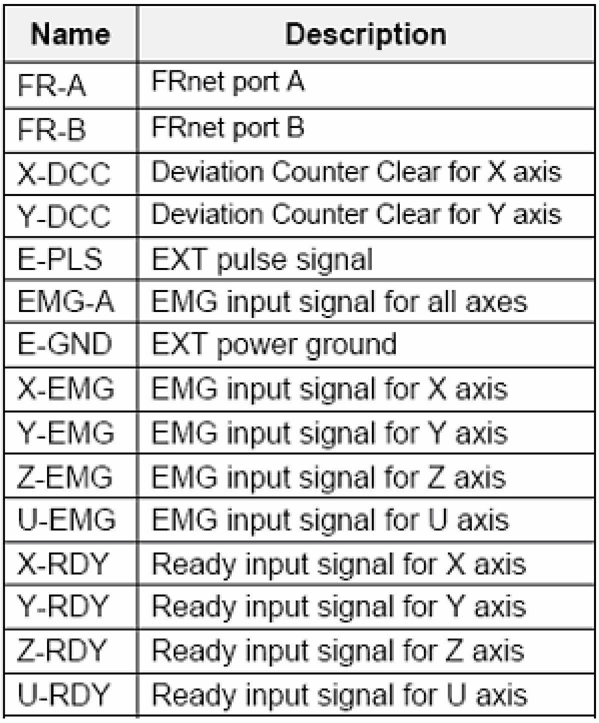


Fig. **2**-**3** Pin definition for CON6

Table **2**-4 CON6 Signal Connection



Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
X-DCC	Deviation Counter Clear for X axis
Y-DCC	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground
X-EMG	EMG input signal for X axis
Y-EMG	EMG input signal for Y axis
Z-EMG	EMG input signal for Z axis
U-EMG	EMG input signal for U axis
X-RDY	Ready input signal for X axis
Y-RDY	Ready input signal for Y axis
Z-RDY	Ready input signal for Z axis
U-RDY	Ready input signal for U axis

■ TB2: External power supply input connector

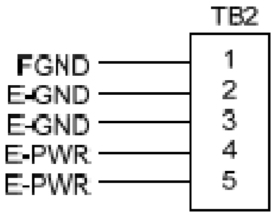
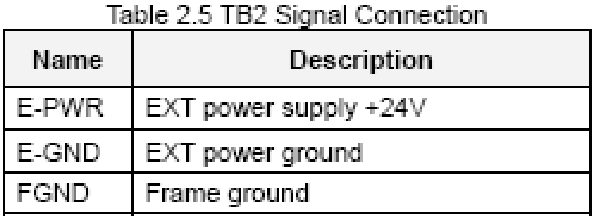


Fig. 2.4 Pin definition for TB2

Table 2.5 TB2 Signal Connection



Name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

► **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happen

- **RJ1 (I/O signals of the FRnet):**

It is connector connect to FRnet – an 8-pin RJ45 connector. FRnet (i8094HF) connector could connect to FRnet series IO modules such as FR-2053, FR-2057. For more information, please refer to ICP DAS website:

http://www.icpdas.com/products/Remote_IO/frnet/frnet_introduction.htm

Fig.2.5 Pin assignment for the 8-pin connector on the DN-8468G.

Table 2.6 I/O connector signal description.

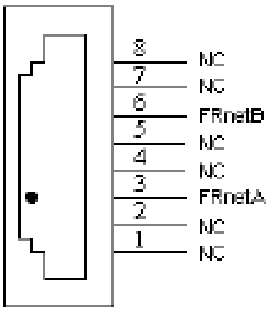
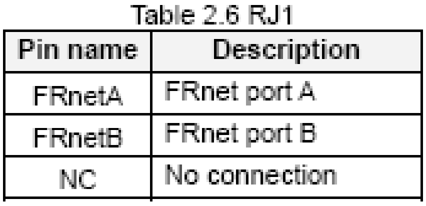


Fig. 2.5 Pin definition for RJ1

Table 2.6 RJ1

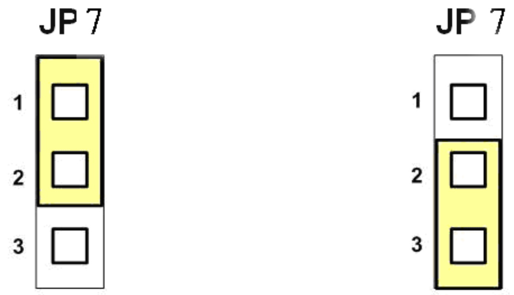


Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

2.2.3 Jumper and Switch Settings

- **JP 7 provides control over the EMG-A signal of the CON6 connector. The following diagram shows the jumper positions and its corresponding states.**



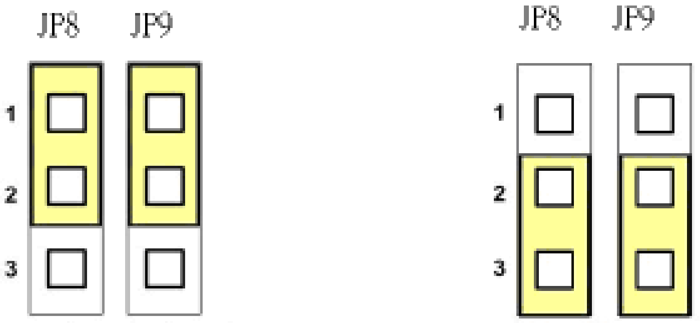
EMG_C
(EMG-A Signal Connected)

EMG_UC
(EMG-A Signal Unconnected)

Fig. 2.6 Jumper 7 setting

- **JP8/9, JP10/11, JP12/13, JP14/15: Jumper 8~15 are used to set the signal type of the pulse output signals. The output signal type could be differential line driver output (2-3 Pin short)or open collector output(1-2 Pin short).**

➧ note: Open Collector output，P+ (N+) and EXT_5V short，offer external usage (Refer to section 2.3)。



Open Collector TTL Output

Line Drive Differential Output

Fig. 2.10 Jumper 8, 9 setting

■ EMG SW: The EMG signals for motor axes

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 2.7 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 2.8, the emergency stop signals can be controlled from EMG signals in CON6.

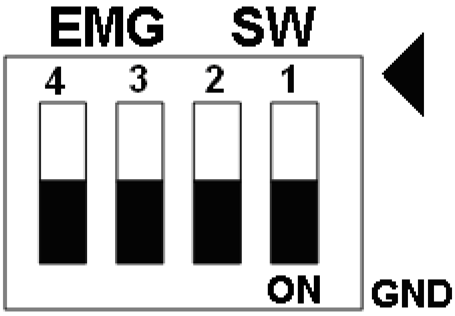


Fig. 2.7 EMG SW setting for normally GND (Default setting)

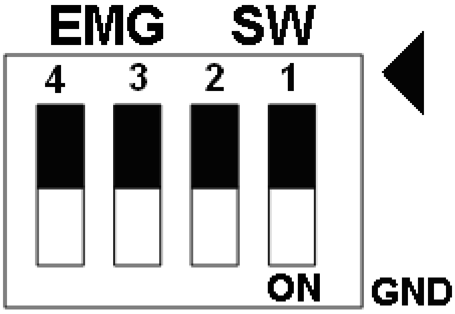


Fig. 2.8 EMG SW setting for user controlled signals.

2.3 Input/Output Connections

2.3.1 Pulse output signals

Differential-Type pulse output circuit

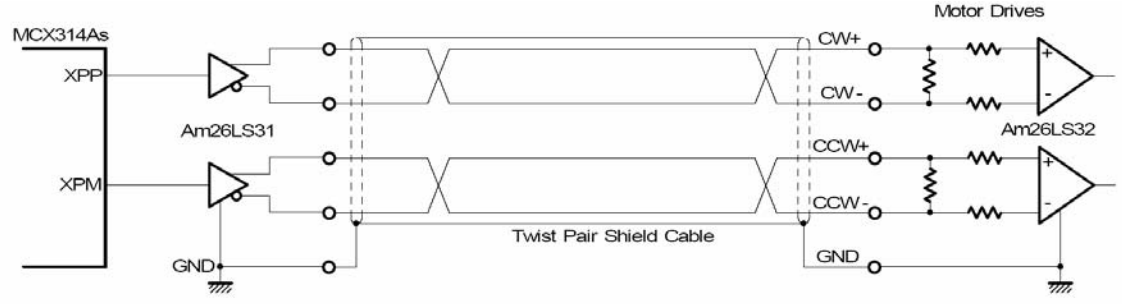

MCX314As
XPP
XPM
Am26LS31
GND
Twist Pair Shield Cable
CW+
CW-
CCW+
CCW-
GND
Motor Drives
Am26LS32
+
-

Fig. 2.8 Differential-Type pulse output circuit

Open collector output

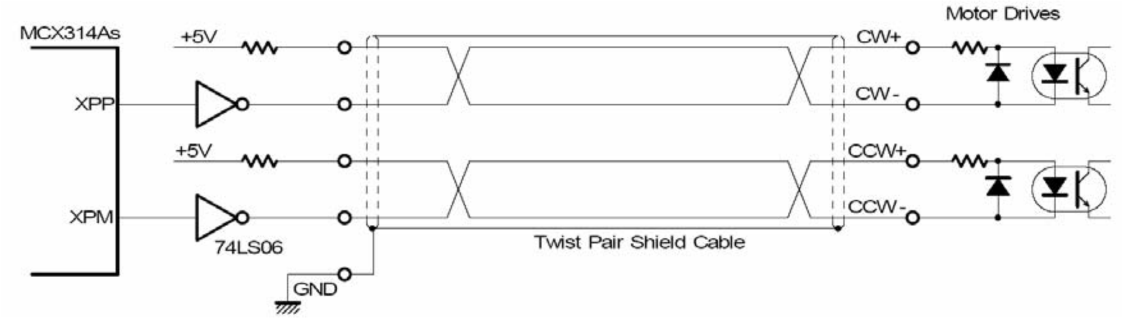

MCX314As
XPP
XPM
+5V
+5V
74LS06
GND
Twist Pair Shield Cable
CW+
CW-
CCW+
CCW-
Motor Drives

Fig. 2.9 open collector output

Pulse Signal Wiring Example:

I8094A/I8094H pulse output signal could be sent out by CW/CCW mode or PULSE/DIR mode. The user could choose Differential-Type and Open-Collector Type byJP2 & JP3.

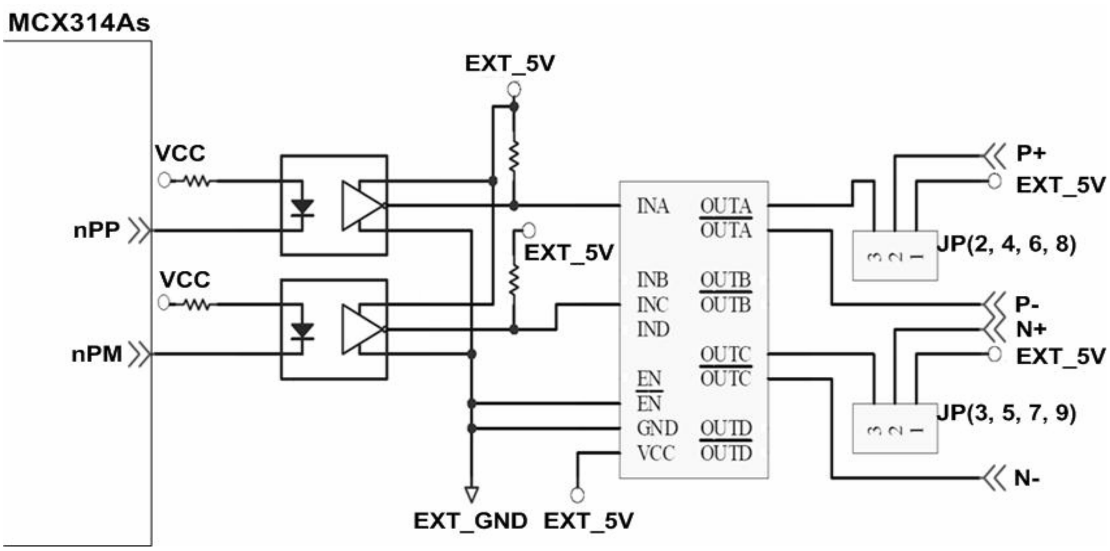

MCX314As
EXT_5V
VCC
nPP
VCC
nPM
EXT_5V
INA
OUTA
OUTA
INB
INC
IND
OUTB
OUTB
OUTC
OUTC
EN
EN
GND
VCC
OUTD
OUTD
EXT_GND
EXT_5V
P+
EXT_5V
3 2 1
JP(2, 4, 6, 8)
P-
N+
EXT_5V
3 2 1
JP(3, 5, 7, 9)
N-

Fig. 2.10 Pulse Signal Wiring Example

2.3.2 Connection for Limit switch Signal

Limit Switch Signal can be used to prevent over traveling appearance of the motion system. User can set up the hardware limit switch to be normal open or normal close by the Function Library. The following figure shows the photo couplers that are used to keep out the sensor noise of the Limit Switch.

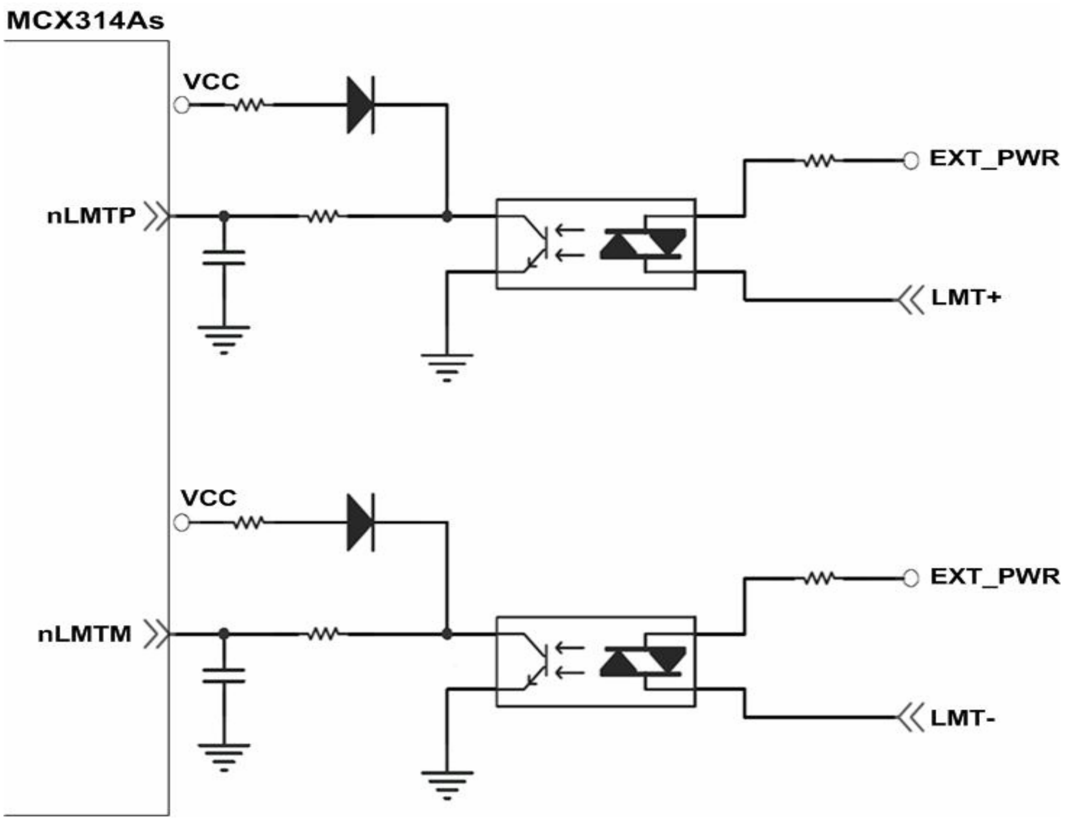

MCX314As
VCC
nLMTP
EXT_PWR
LMT+
VCC
nLMTM
EXT_PWR
LMT-

Fig. 2.11 Wiring sample

2.3.3 General Purpose DI Signals(nINPOS,nALARM)

nINPOS is a digital input signal for servo driver in-Position control. User could enable or disable this function by Function Library.

nALARM is a digital input signal for servo driver alarm signal. The output pulse will be stopped when I8094A/I8094H receives this signal. User could enable or disable this function by Function Library.

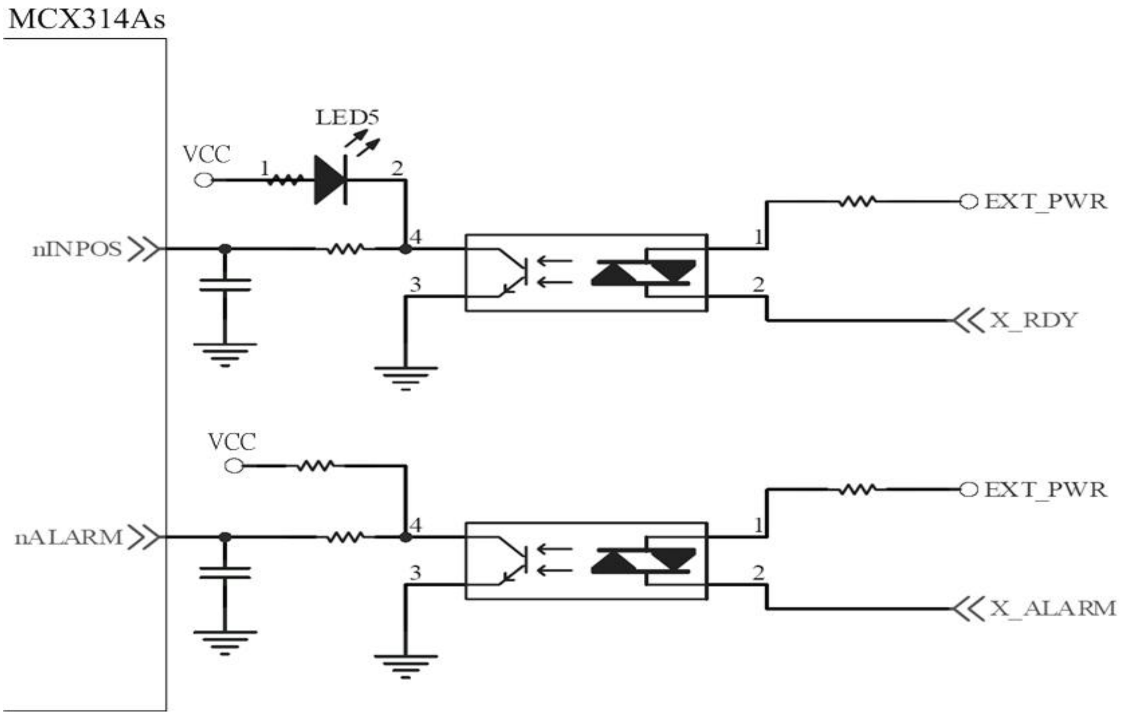

MCX314As
LED5
VCC
1
2
nINPOS
4
3
1
2
EXT_PWR
X_RDY
VCC
nALARM
4
3
1
2
EXT_PWR
X_ALARM

Fig. 2.12 Wiring sample

2.3.4 Encoder Signals

The following diagram shows Differential-Type encoder signals. Connect the Phase A signal to A+ and A- pins and connect Phase B signal to B+ and B- pins. After the high speed photo coupler isolation, the isolated encoder signals are connected to motion IC of ASIC chip.

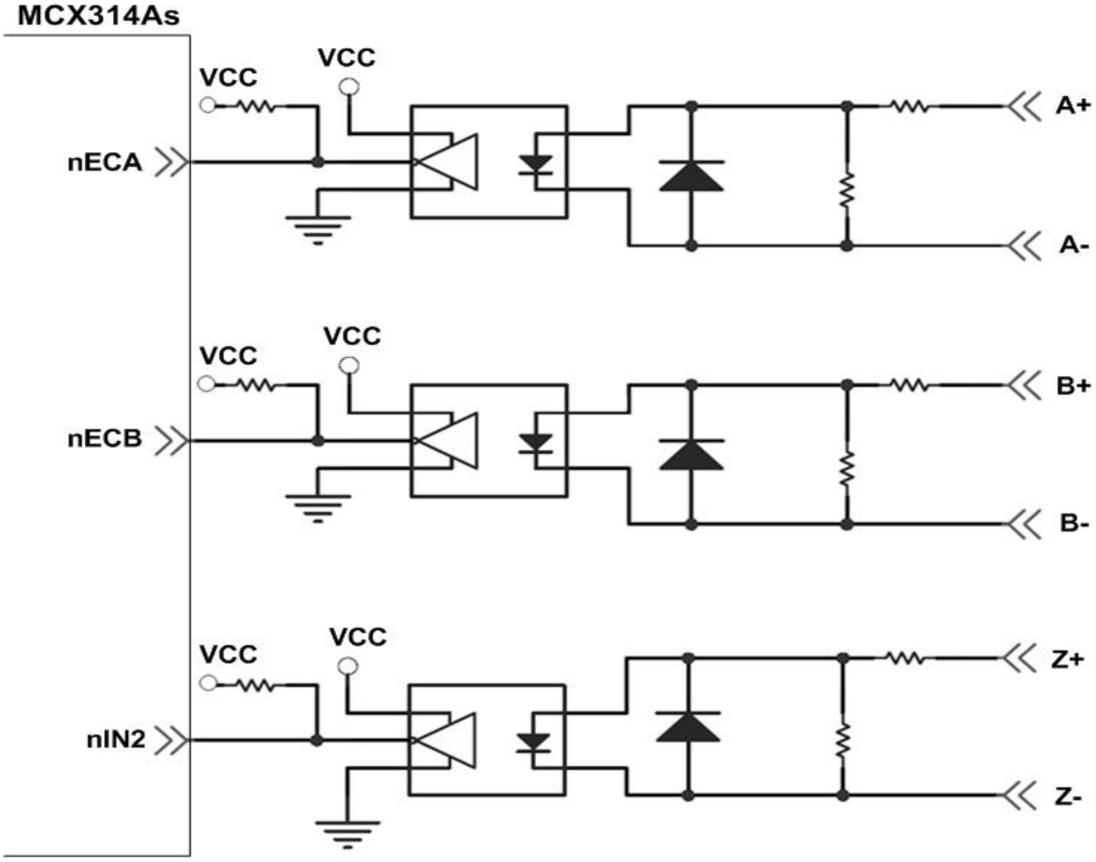

MCX314As
VCC
VCC
nECA
A+
A-
VCC
VCC
nECB
B+
B-
VCC
VCC
nIN2
Z+
Z-

Fig. 2.13 Encoder signal connection

2.3.5 External pulse signal

The following diagram shows an example for external pulse signal. After the high speed photo coupler isolation, the isolated encoder signals are connected to motion IC of ASIC chip.

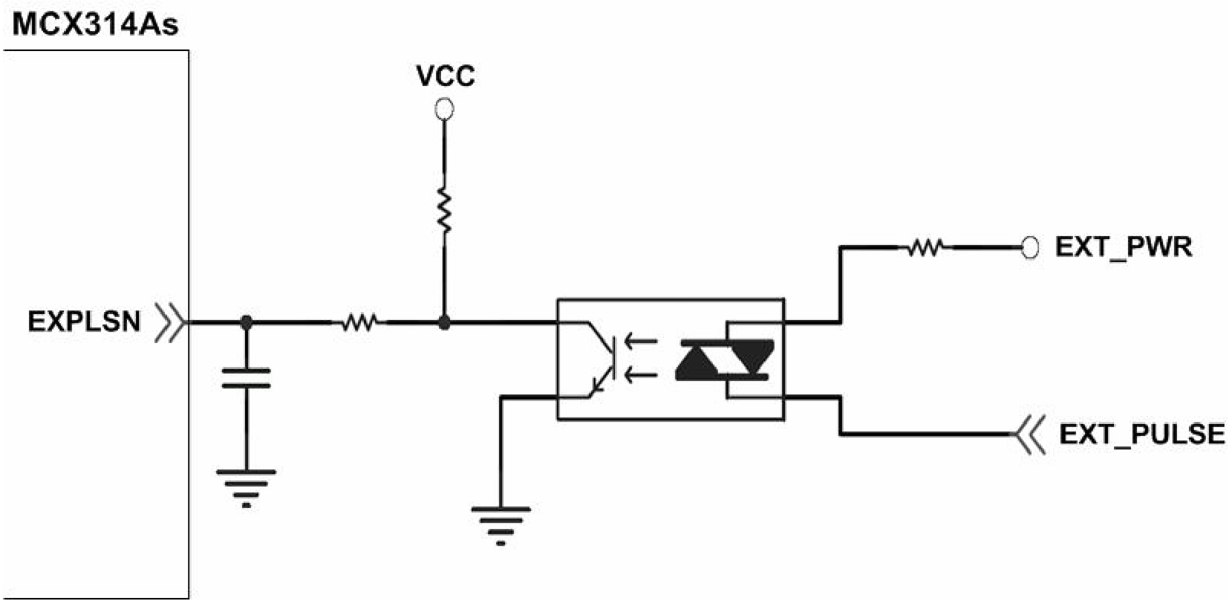

MCX314As
VCC
EXT_PWR
EXPLSN
EXT_PULSE

Fig. 2.14 wiring example for external pulse signal

2.3.6 Emergency Stop Signal

The following diagram shows a wiring example for Emergency STOP signal. When received emergency stop signal, all axes will be stopped and the error flag will be set as 1. After the high speed photo coupler isolation, the isolated encoder signals are connected to motion IC of ASIC chip.

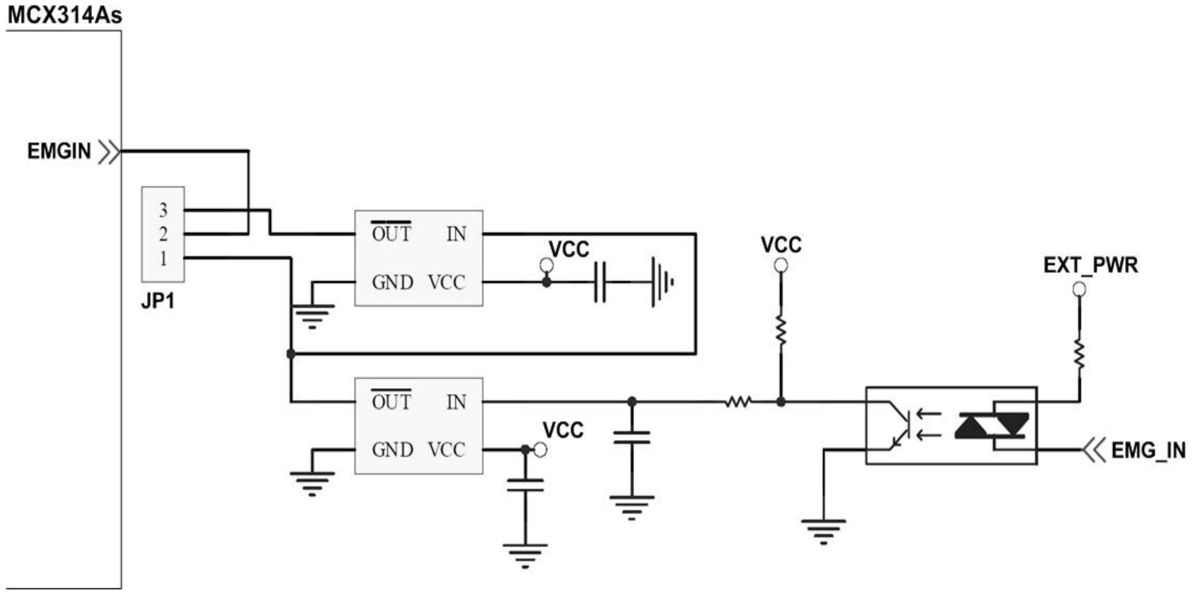

MCX314As
EMGIN
3
2
1
JP1
OUT
IN
GND
VCC
VCC
OUT
IN
GND
VCC
VCC
VCC
EXT_PWR
EMG_IN

Fig. 2.15 Wiring example for emergency stop signal

2.3.7 External Pulse Input Signal (EXP+,EXP-)

External pulse input signal is signal for external input driver. The following diagram shows an external signal **+/- input wiring.** User can set the signals as fixed pulse CW/CCW mode, continuous pulse CW/CCW mode, or A/B phase manual pulsar mode (please refer to section 5.1 for detail setting configuration).

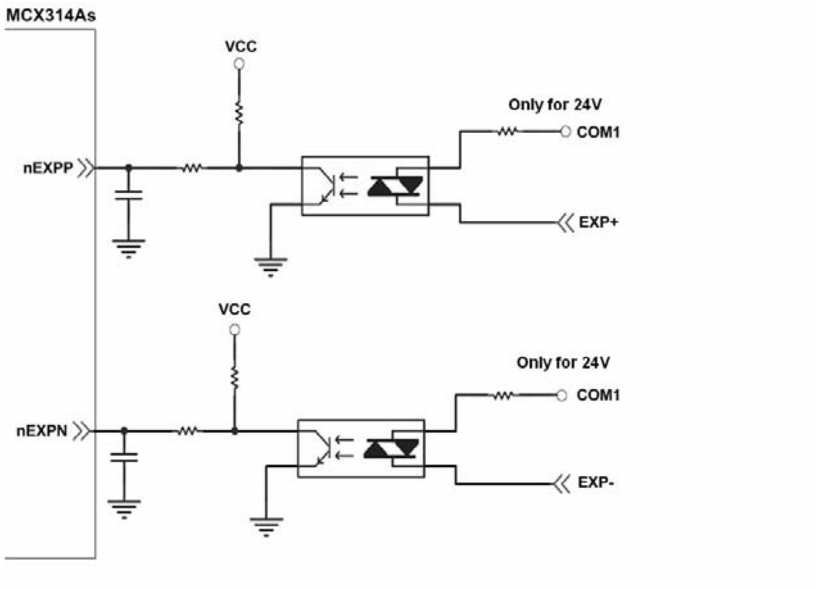

MCX314As
VCC
Only for 24V
COM1
nEXPP
EXP+
VCC
Only for 24V
COM1
nEXPN
EXP-

Fig. 2.16 Wiring example for External Pulse Input Signal(EXP+,EXP-)

2.3.8 Servo On/Off Output Signal (ENABLE)

The following diagram shows a wiring example for output signal. This output signal could be applied to enable or disable the driver.

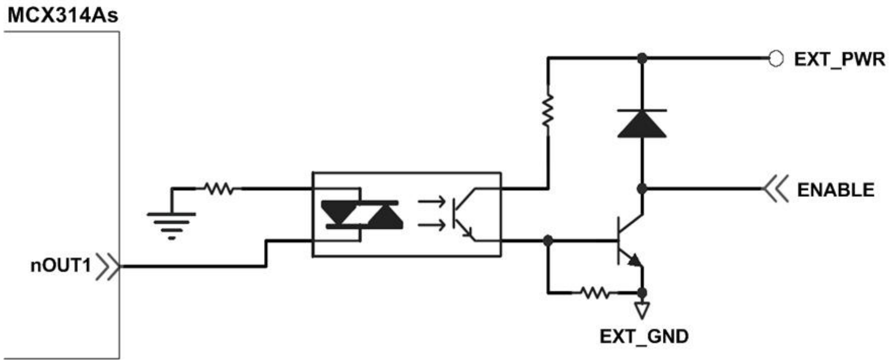


Fig. 2.17 Wiring Diagram for Servo On/Off Output Signal

2.3.9 Compare Trigger Output

The following diagram is a wiring example for Trigger Output Signal. This output signal could be adapted only on axis X and axis Y for Compare Trigger Output for specific applications such as image capture.

2.4 Connection Example for Motor Driver

The following diagram is the connection example between MITSUBISH MR-J2S AC servo driver and the extension boardDN-8468G.

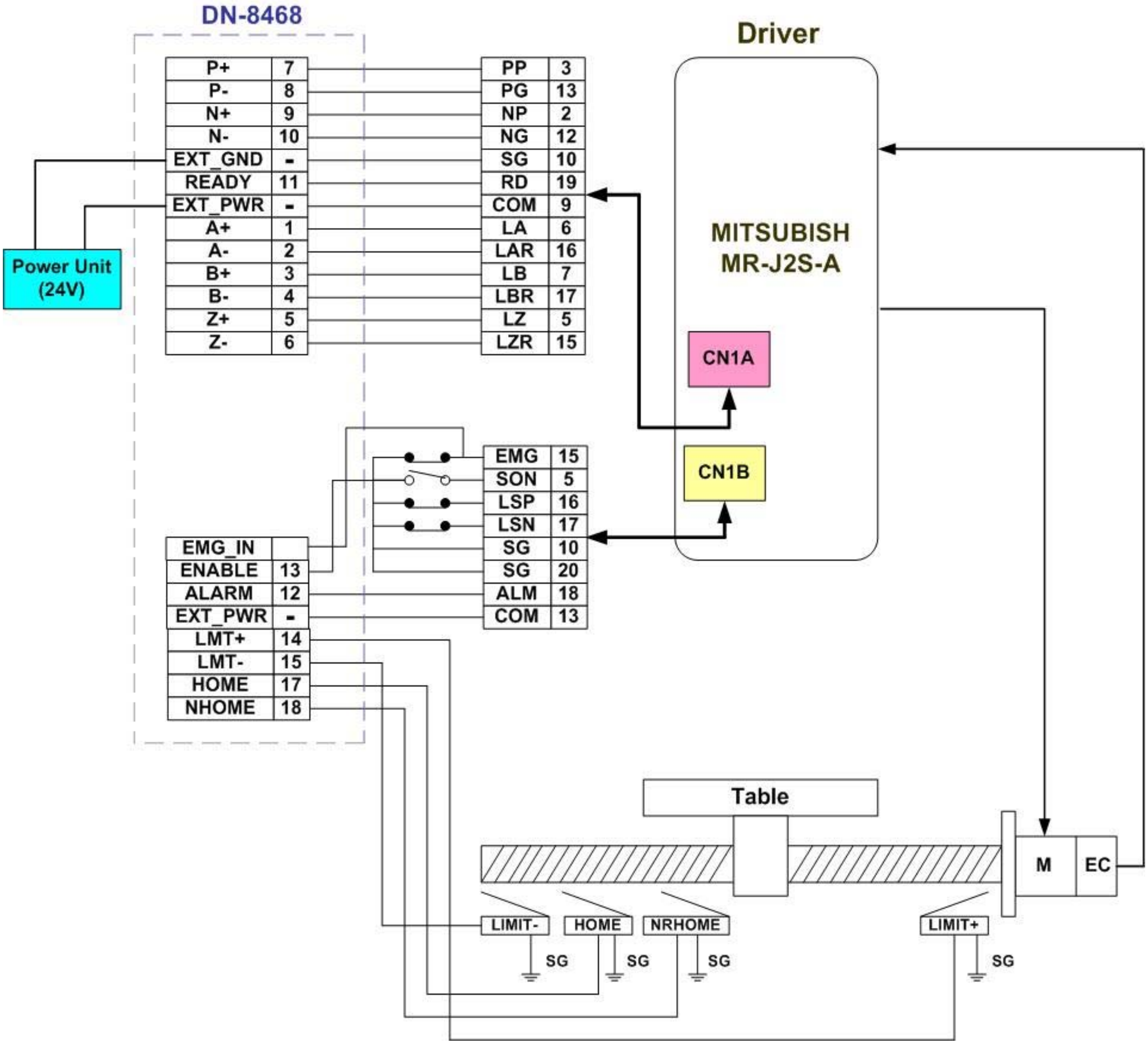
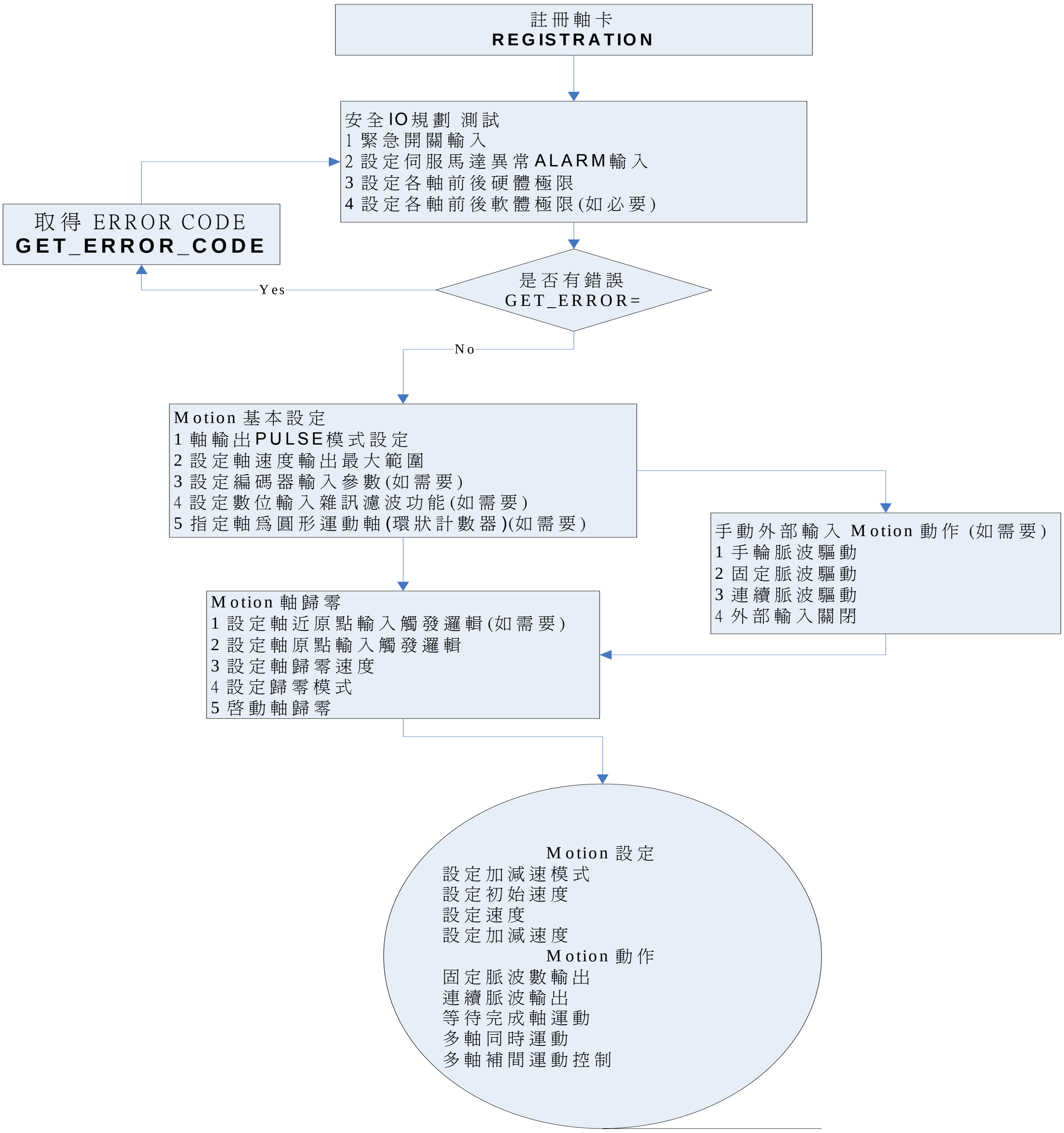

DN-8468
Driver
P+ 7
P- 8
N+ 9
N- 10
EXT_GND -
READY 11
EXT_PWR -
A+ 1
A- 2
B+ 3
B- 4
Z+ 5
Z- 6
PP 3
PG 13
NP 2
NG 12
SG 10
RD 19
COM 9
LA 6
LAR 16
LB 7
LBR 17
LZ 5
LZR 15
Power Unit (24V)
MITSUBISH MR-J2S-A
CN1A
CN1B
EMG 15
SON 5
LSP 16
LSN 17
SG 10
SG 20
ALM 18
COM 13
EMG_IN
ENABLE 13
ALARM 12
EXT_PWR -
LMT+ 14
LMT- 15
HOME 17
NHOME 18
Table
M
EC
LIMIT-
HOME
NRHOME
LIMIT+
SG
SG
SG
SG

Fig. 2.18 The connection between MR-J2S AC servo driver and DN-8468G extension board.

3 i8094A/i8094H Software Development

3.1 Software development Overview

For detail information, please refer to **i8094H_star** sample code.


註冊軸卡
REGISTRATION
安全IO規劃 測試
1 緊急開關輸入
2 設定伺服馬達異常ALARM輸入
3 設定各軸前後硬體極限
4 設定各軸前後軟體極限(如必要)
取得 ERROR CODE
GET_ERROR_CODE
是否有錯誤
GET_ERROR=
Yes
No
Motion 基本設定
1 軸輸出PULSE模式設定
2 設定軸速度輸出最大範圍
3 設定編碼器輸入參數(如需要)
4 設定數位輸入雜訊濾波功能(如需要)
5 指定軸爲圓形運動軸(環狀計數器)(如需要)
手動外部輸入 Motion 動作 (如需要)
1 手輪脈波驅動
2 固定脈波驅動
3 連續脈波驅動
4 外部輸入關閉
Motion 軸歸零
1 設定軸近原點輸入觸發邏輯(如需要)
2 設定軸原點輸入觸發邏輯
3 設定軸歸零速度
4 設定歸零模式
5 啓動軸歸零
Motion 設定
設定加減速模式
設定初始速度
設定速度
設定加減速度
Motion 動作
固定脈波數輸出
連續脈波輸出
等待完成軸運動
多軸同時運動
多軸補間運動控制

3.1.1 Register Module

You are required to register your 8094/I8094F module before starting to send any command, or your will receive an error message. Please refer to **“i8094H_Manual_1.3tc.pdf section 2.2” i8094H_REGISTRATION()” for more detail information.**

3.2 Safety IO Setting (Troubleshooting for Motion not working)

3.2.1 Emergency Stop Signal Input

The emergency stop switch is used for stopping an undesired motion for emergency situation; the user could immediately stop Motion action to ensure human/machine safety.

If you would like to disable Emergency Stop Signal, please close breaks between 2 and 3 pin of JP1.

If you would like to enable Emergency Stop Signal, please close breaks between 1 and 2 pin of JP1. Please connect **EMG_IN to (N.C), and install the switch in an appropriate location.**

3.2.2 Configure the Servo ALARM Signals

These signals will be input when there are ALARM occurred on servomotor drivers, therefore the user will be able to get notification immediately for further actions. You could set up operating mode (Enable or Disable) or select proper trigger level of these signals.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 2.13, function i8094H_SET_ALARM() for detail settings.**

3.2.3 Configure the Limit Switch Signals(±EL)

To insure the safety of machine, hardware limit switches are placed at the both ends of machine traveling range. When the hardware limit switch sensors detect the machine, PISO-PS400 will stop immediately. You could set up operating mode (Enable or Disable) or select proper trigger level of these signals.
Please refer to Manual **"i8094H_Manual_1.3tc.pdf" section 2.6, function i8094H_SET_HLMT() for detail settings.**

3.2.4 Configure the Software Limit(±SEL)

To insure the safety of machine, hardware limit switches are placed at the both ends of machine traveling range. However, you could also set up software limits for earlier detection before hardware limit can take effect. When it reaches the software limit, PISO-PS400 will stop immediately. You could set up operating mode (Enable or Disable) or select proper trigger conditions of these signals.

Please refer to Manual **"i8094H_Manual_1.3tc.pdf" section 2.10, function i8094H_SET_SLMT() & i8094H_CLEAR_SLMT() for detail settings.**

3.3 Error Checking(GET_ERROR)

When error occurs, you could get the error-code by *GET_ERROR_CODE()* to check out error message and perform troubleshooting. The user could also check all DI status to ensure DI input accuracy.

Please refer to Manual **"i8094H_Manual_1.3tc.pdf" section 3.5, function i8094H_GET_DI() for detail settings.**

3.4 Motion Basic Configuration

Motion basic configuration that required for general purposes are as follow:

1. Pulse output mode setting: Pulse/Dir、CW/CCW…

i8094MF_SET_PULSE_MODE() (Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 2.4, function i8094H_SET_PULSE_MODE() for detail settings.**)

2. Set up Max. speed limitation for each axis

   (Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 2.5, function i8094H_SET_MAX_V () for detail settings.**)

3. Encoder input setting (optional)

   (Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 2.11, function i8094H_SET_ENCODER() for detail settings.**)

4. DI noise filter setting(optional)

   (Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 2.15, function i8094H_SET_FILTER() for detail settings.**)

5. Circular motion declaration(Ring counter)(optional)

   (Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 2.16, function i8094H_VRING_ENABLE() for detail settings.**)

3.5 Manual Pulse Generator Testing (Optional)

The user could perform pulse generator function manually to drive forward or backward motion. This operation could ensure if the DI signals are functioning normally and if the direction(+/-) is correct, therefore the users could make further adjustments for lines and parameters.

The following gives you further information on three ways to initiate Manual Pulse Generator Testing:

1. A/B phase Manual Pulse Generator:

Use the A/B phase Manual Pulse Generator for forward/backward moving.

(Please refer to Manual "**i8094H_Manual_1.3tc.pdf" section 2.18.1, function i i8094H_EXD_MP()for detail settings.**)

2. Fixed-pulse driving Manual Pulse Generator: The users could preset the driving pulses at a fixed intensity and when press the forward or backward button, the motor will move a few steps(Pulse) forward or backward.

(Please refer to Manual "**i8094H_Manual_1.3tc.pdf" section 2.18.2, function i i2.18.2" i8094H_EXD_FP() for detail settings.**)

3. Continuous- pulse driving Manual Pulse Generator: The users could preset the output-pulse frequency at a fixed velocity (Hz), the motor will keep on moving forward or backward at fixed velocity when pressing the forward or backward button and the motion will be stopped immediately when releasing the button.

(Please refer to Manual "**i8094H_Manual_1.3tc.pdf" section 2.18.3, function i8094H_EXD_CP() for detail settings.**)

4. Disable external pulse input:

This command is for disabling the external pulse input operated by any of the three functions above.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 2.18.4, function i8094H_EXD_DISABLE() for detail settings.**

3.6 Home Search

I8094A/I8094H offers automatic home search function; if providing with proper settings, it would function automatically. The main steps are as bellows:

- Near-home sensor searching under high-speed motion.
- Home sensor searching under low-speed motion.
- Servomotor Z-phase searching under low-speed motion.
- Offset movement to the origin of the working area under high-speed motion.

A few steps could be skipped to adjust settings accordingly to meet customers' actual needs. This operation could be performed automatically, therefore economize on CPU resource and reduce programming efforts. Even though there are only four home search steps, by software functions adjustments that offers home search direction configurations and with the variations being made by skipping certain steps, there are actually more than 10 home search modes provided.

3.6.1 Home Search Configuration

1. Logic level setting for Near home sensor and Home sensor (optional)：

Please refer to Manual **"i8094H_Manual_1.3tc.pdf" section 2.8, function i8094H_SET_NHOME() for detail settings.**

2. Home sensor logic level setting：

Please refer to Manual **"i8094H_Manual_1.3tc.pdf" section 2.9, function i8094H_SET_HOME_EDGE() for detail settings.**

3. Home-speed setting：

Please refer to Manual **"i8094H_Manual_1.3tc.pdf" section 5.1, function i8094H_SET_HV() for detail settings.**

Please refer to Manual **"i8094H_Manual_1.3tc.pdf" section 6.1.2, function i8094H_SET_SV() for detail settings.**

4. Home mode setting：

Please refer to Manual **"i8094H_Manual_1.3tc.pdf" section 5.3, function i8094H_SET_HOME_MODE() for detail settings.**

3.6.2 Running the Home Search

1 Start homing：

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 5.4, function i8094H_HOME _START() for detail settings.**

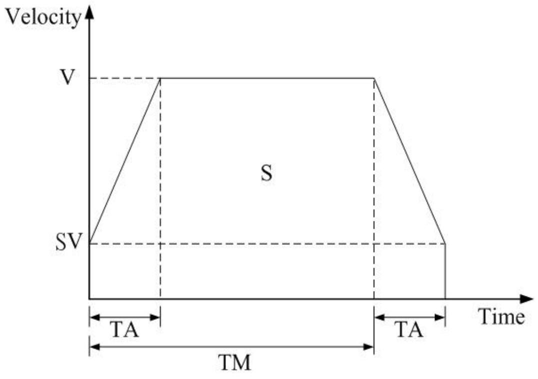
2 Waiting for completing homing operation：

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.5.3, function i8094H_STOP_WAIT() for detail settings.**

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 7.2.7, function i8094H_MP_STOP_WAIT() for detail settings.**

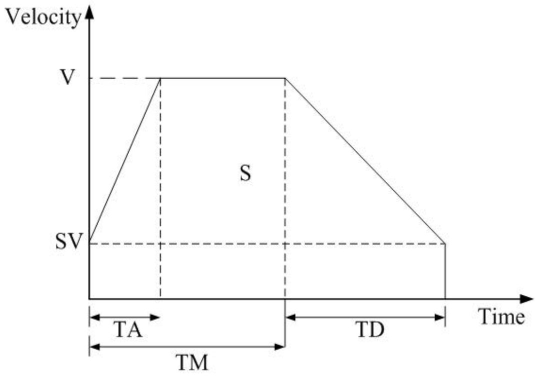
3.7 Basic Motion

3.7.1 Speed Profile of the Motion Control

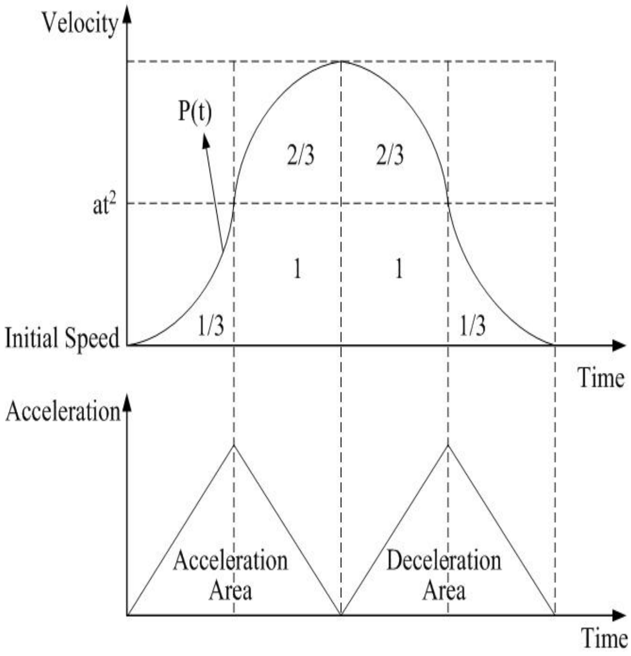

Velocity
V
S
SV
TA
TA
Time
TM

1 Symmetrical T-profile of motion velocity

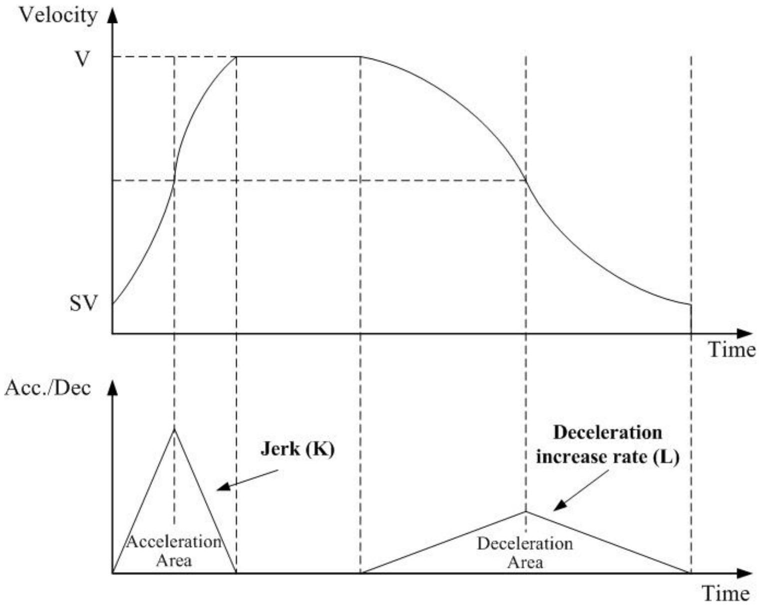
(If SV is larger than V or equal to V, perform constant velocity driving)


Velocity
V
S
SV
TA
TD
Time
TM

2 Asymmetrical T-profile of motion velocity


Velocity
P(t)
2/3
2/3
at²
1
1
1/3
1/3
Initial Speed
Time
Acceleration
Acceleration Area
Deceleration Area
Time

3 Symmetrical S-curve of motion velocity


Velocity
V
SV
Time
Acc./Dec
Jerk (K)
Deceleration increase rate (L)
Acceleration Area
Deceleration Area
Time

4 Asymmetrical S-curve of motion velocity

3.7.2 Basic Settings For Single Axis

1. Setting the mode of Acceleration/deceleration: There are four speed modes of operation：

0 → Symmetrical T-Profile (SV、V、A、AO)
1 → Symmetrical S-curve (SV、V、K、AO)
2 → Asymmetrical T-profile (SV、V、A、D、AO)
3 → Asymmetrical S-curve (SV、V、K、L、AO)

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.1.1, function i8094H_NORMAL_SPEED() for detail settings.**

2. Setting the start velocity: Set lowest speed：

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.1.2, function i8094H_SET_SV() for detail settings.**

3. Setting the Velocity: Set the speed at a certain rate：

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.1.3, function i8094H_SET_V() for detail settings.**

4. Setting the Acceleration/Deceleration speed: Set the Acceleration/Deceleration speed at a certain rate：

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.1.4, function i i8094H_SET_A() for detail settings.**

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.1.5, function i8094H_SET_D() for detail settings.**

3.7.3 Basic Motion of Single Axis

1. Fixed-pulse driving output: Perform fixed-quantity of single axis pulse output.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.1.9, function i8094H_FIXED_MOVE() for detail settings.**

2. Continuous-pulse driving output: Perform continuous pulse output of single axis.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.1.10, function i8094H_CONTIUNE_MOVE ()for detail settings.**

3. Waiting for motion done: Waiting for finishing the axis driving operation.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.5.3, function i8094H_STOP_WAIT() for detail settings.**

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 7.2.7, function i8094H_MP_STOP_WAIT() for detail settings.**

3.7.4 Basic Setting of Muti-Axes Interpolation

1. Setting axes of interpolation: Select the axes that are required to perform interpolation.

Please refer to Manual "**i8094H_Manual_1.3tc.pdf" section 6.2.1, function i8094H_AXIS_ASSIGN() for detail settings.**

2. Setting the mode of Acceleration/Deceleration of vector: There are twelve modes:

0 → 2-axes(Linear & ARC & Circular) Fixed-vector velocity (VV)
1 → 2-axes linear symmetrical T-profile (VSV、VV、VA、VAO)
2 → 2-axes linear symmetrical S-curve (VSV、VV、VK、VAO)
3 → 2-axes linear asymmetrical T-profile (VSV、VV、VA、VD、VAO)
4 → 2-axes linear asymmetrical S-curve (VSV、VV、VK、VL、VAO)
5 → 2-axes (ARC & Circular) symmetrical T-profile (VSV、VV、VA、VAO)
6 → 2-axes (ARC & Circular) asymmetrical T-profile (VSV、VV、VA、VD、VAO)
7 → 3-axesFixed-vector velocity (VV)
8 → 3-axes linear symmetrical T-profile (VSV、VV、VA、VAO)
9 → 3-axes linear symmetrical S-curve (VSV、VV、VK、VAO)
10 → 3-axes linear asymmetrical T-profile (VSV、VV、VA、VD、VAO)
11 → 3-axes linear asymmetrical S-curve (VSV、VV、VK、VL、VAO)

Please refer to Manual "**i8094H_Manual_1.3tc.pdf" section 6.2.2, function i8094H_VECTOR_SPEED() for detail settings.**

3. Setting the start vector velocity: Set the lowest vector speed.

Please refer to Manual "**i8094H_Manual_1.3tc.pdf" section 6.3.3, function i8094H_SET_VSV() for detail settings.**

4. Setting the vector velocity: Set the vector speed at a certain rate

Please refer to Manual "**i8094H_Manual_1.3tc.pdf" section 6.3.4, function i8094H_SET_VV() for detail settings.**

5. Setting the velocity of Acceleration/Deceleration of vector: Set the speed of Acceleration/Deceleration of vector at a certain rate.

Please refer to Manual "**i8094H_Manual_1.3tc.pdf" section 6.3.5, function i8094H_SET_VA() for detail settings.**

Please refer to Manual "**i8094H_Manual_1.3tc.pdf" section 6.3.6, function i8094H_SET_VD() for detail settings.**

3.7.5 Basic Motion of Muti-Axes Interpolation

1. 2-axes linear interpolation: Perform 2-axes linear interpolation.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.2.10, function i8094H_LINE_2D() for detail settings.**

2. 3-axes linear interpolation: Perform 3-axes linear interpolation.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.2.11, function i8094H_LINE_3D() for detail settings.**

3. 2-axes ARC interpolation: Perform 2-axes ARC interpolation.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.2.12, function i8094H_ARC_CW() for detail settings.**

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.2.12, function i8094H_ARC_CCW() for detail settings.**

4. 2-axesCircular interpolation: Perform 2-axes Circular interpolation.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.2.13, function i8094H_CIRCLE_CW() for detail settings.**

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.2.13, function i8094H_CIRCLE_CCW() for detail settings.**

3.8 Advance Motion

1. 2-axes continuous interpolation of rectangle: Perform2-axes continuous interpolation of rectangle.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.4.1, function i8094H_RECTANGLE() for detail settings.**

2. 2-axes continuous interpolation of line:

Initial setting for continuous interpolation of 2-axes line(Symmetrical T-profile).

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.4.2, function i8094H_LINE_2D_INITIAL() for detail settings.**

Perform 2-axes continuous interpolation of line.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.4.2, function i8094H_LINE_2D_CONTINUE() for detail settings.**

3. 3-axes continuous interpolation of line:

Initial setting for continuous interpolation of line(symmetrical T-profile).

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.4.3, function i8094H_LINE_3D_INITIAL() for detail settings.**

Perform 3-axes continuous interpolation of line.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.4.3, function i8094H_LINE_3D_CONTINUE() for detail settings.**

4. Others continuous interpolation: Muti-point continuous interpolation, 3-axes Helix interpolation, 2-axes Ratio motion

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.4.4~6.4.10 for detail information.**

3.9 Motion Synchronization Action

i8094A/i8094H provides a lot of functions that support Synchronization Action, such as comparison of EP, LATCH…and so on.

Please refer to Manual “**i8094H_Manual_1.3tc.pdf” section 6.4.4~6.4.10 for detail informaion.**

4 SOFTWARE GETTING STARTED GUIDE

4.1 WinCon eVC++

4.1 WinCon eVC++ Guideline

4.1.1 Files you will need

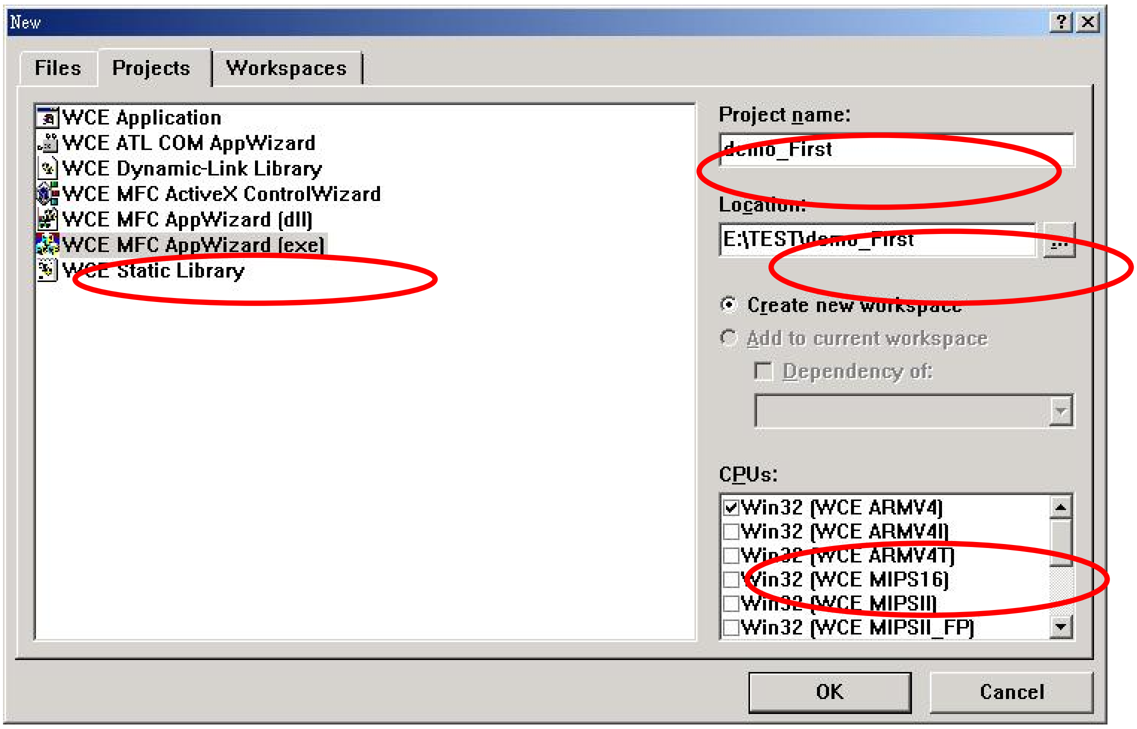
Please make sure you get the following files in your PC:

1. I8094h.lib
2. I8094h.dll
3. I8094h.h

If you don't have these files, please find them in the CD that comes along with the device, or you could download the latest version from ICPDAS's website http://www.icpdas.com/download/download-list.htm .

4.1.2 Create a new eVC++ Application Project

1. Install and execute Microsoft eVC++ 4.0.
2. Click **File** -> **New** to create a new application project.
3. In **Projects** property page, select **WCE MFC AppWizard** (exe)
4. In **Projects** property page, specify the project name as **Demo_First**.
5. In **Projects** property page, key in or browse the disk path in the field "Location".
6. In **Projects** property page, check **Win 32[WCE ARMV4]** in CPUs list.
7. If necessary, please also select others options together. And then click **OK**.


New
Files
Projects
Workspaces
WCE Application
WCE ATL COM AppWizard
WCE Dynamic-Link Library
WCE MFC ActiveX ControlWizard
WCE MFC AppWizard (dll)
WCE MFC AppWizard (exe)
WCE Static Library
OK
Cancel

Project name: demo_First

Location: E:\TEST\demo_First

● Create new workspace

○ Add to current workspace

☐ Dependency of:

CPUs:

☑ Win32 (WCE ARMV4)

☐ Win32 (WCE ARMV4I)

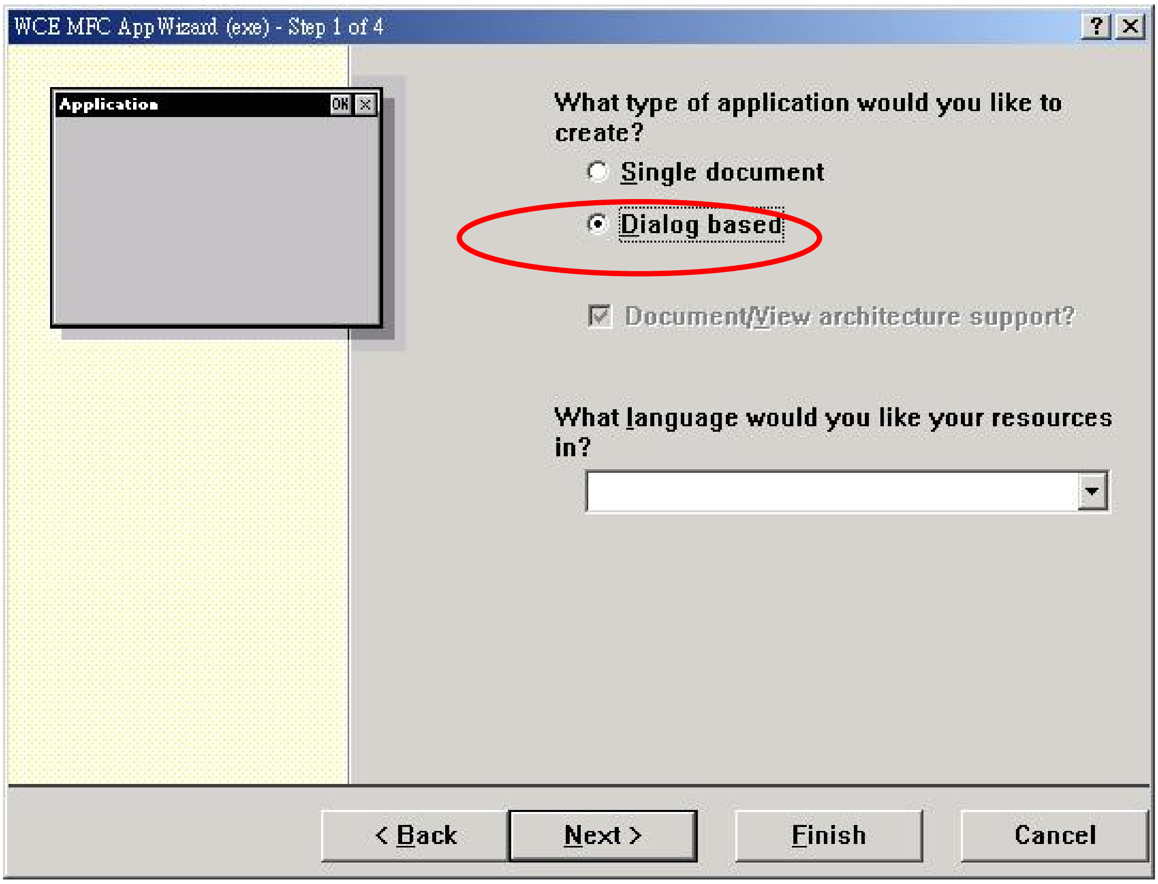
☐ Win32 (WCE ARMV4T)

☐ Win32 (WCE MIPS16)

☐ Win32 (WCE MIPSII)

☐ Win32 (WCE MIPSII_FP)

8. Choose **Dialog based** and click **NEXT**


WCE MFC AppWizard (exe) - Step 1 of 4
Application
OK
< Back
Next >
Finish
Cancel

What type of application would you like to create?

○ Single document

● Dialog based

☑ Document/View architecture support?

What language would you like your resources in?

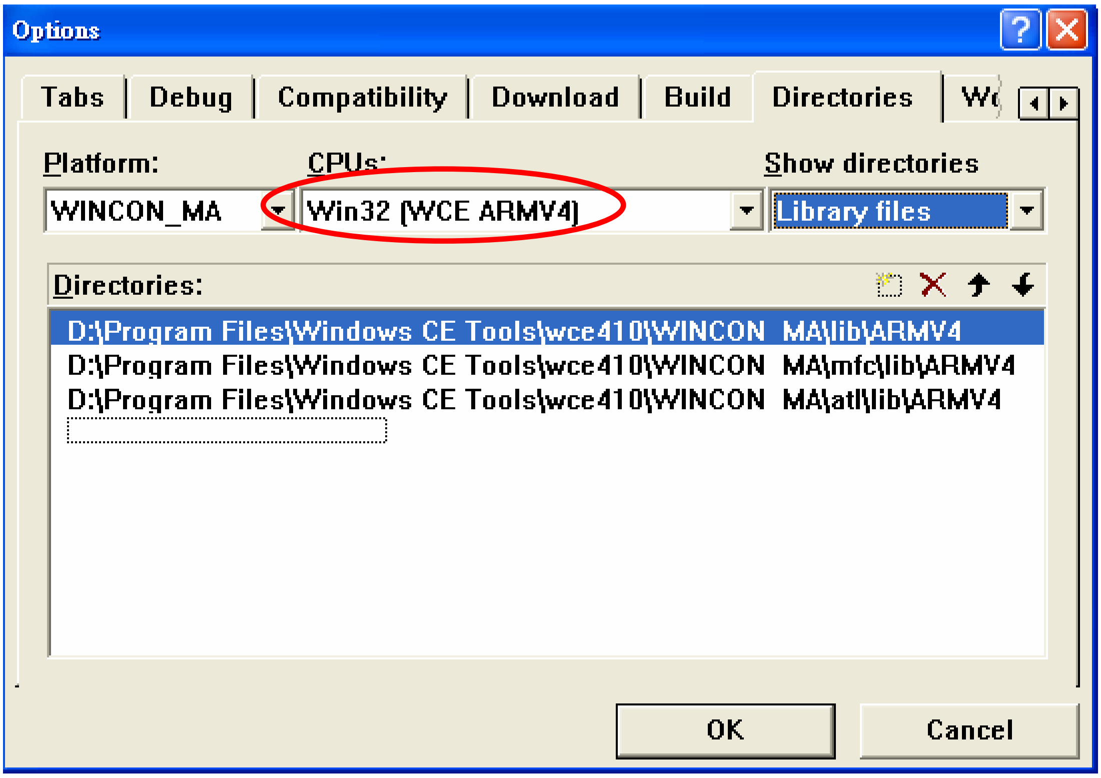
9. Click **Finish** to end establishment of the new project.

4.1.3 Add the Reference Path into eVC++ Application Project

A. On the **Tools** menu, click **Options**. The **Options** popup menu will appears.

B. Click on tab **Directories**, choose Platform to be **WINCON_MA**, select “Win32 **[WCE ARMV4]** in the **CPUs** list.

C. Specify the path of **Include files** and **Library files**. To add the path, double-click on the blank line at the end of the **Directories** list. Please key in the specific path that your header files located. For example, C:\DAQPRO\Wincon\inc.



Platform: WINCON_MA

CPUs: Win32 (WCE ARMV4)

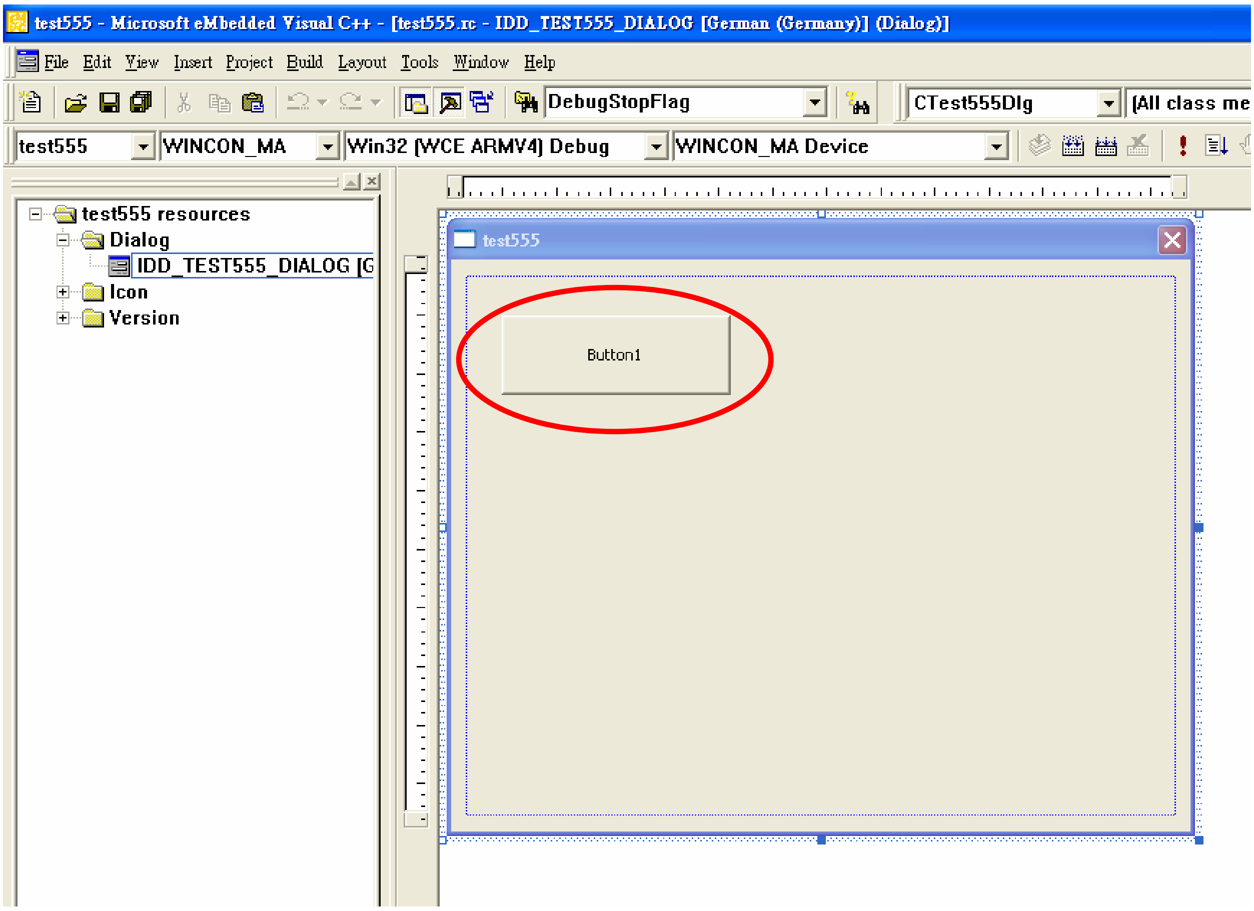
Show directories: Library files

Directories:

D:\Program Files\Windows CE Tools\wce410\WINCON MA\lib\ARMV4
D:\Program Files\Windows CE Tools\wce410\WINCON MA\mfc\lib\ARMV4
D:\Program Files\Windows CE Tools\wce410\WINCON MA\atl\lib\ARMV4

4.1.4 Start the eVC++ Sample

Add a **BUTTON** on Dialog, as below:

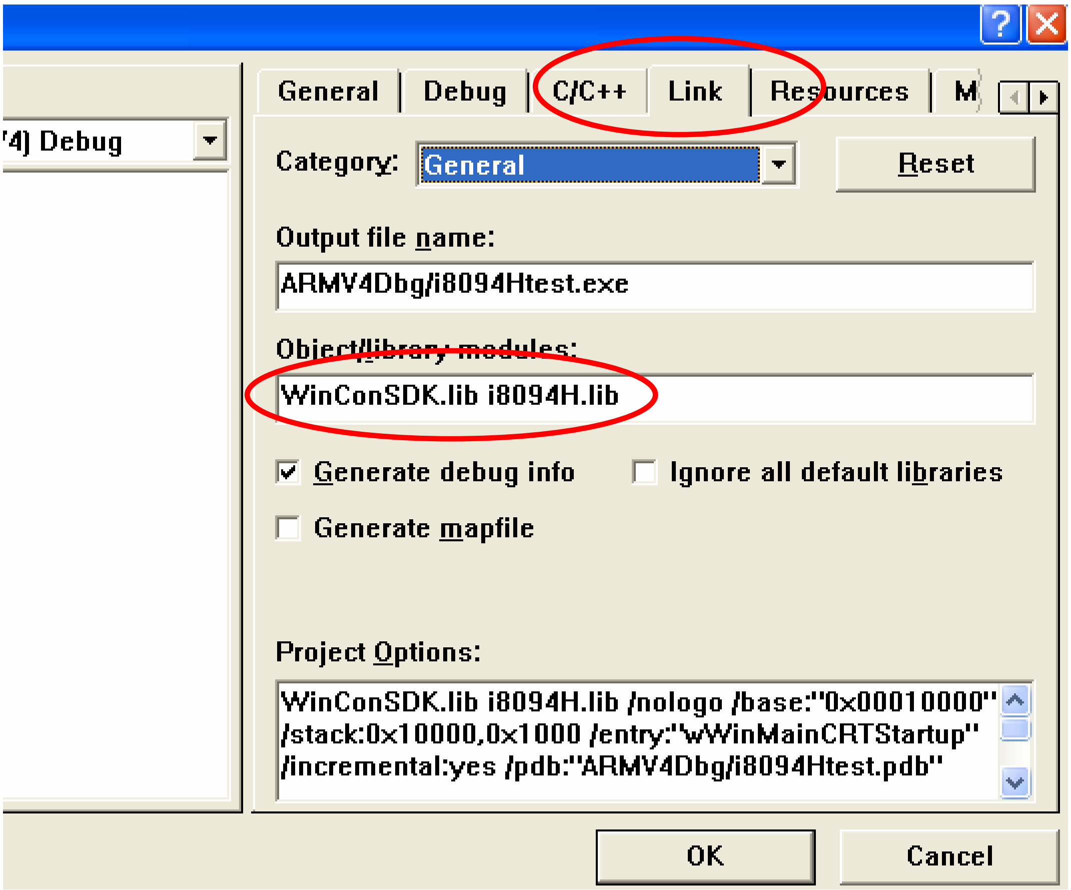

test555 - Microsoft eMbedded Visual C++ - [test555.rc - IDD_TEST555_DIALOG [German (Germany)] (Dialog)]
File Edit View Insert Project Build Layout Tools Window Help
DebugStopFlag
CTest555Dlg
[All class me
test555
WINCON_MA
Win32 (WCE ARMV4) Debug
WINCON_MA Device
test555 resources
Dialog
IDD_TEST555_DIALOG [G
Icon
Version
test555
Button1

Double-click on BUTTON to create a subprogram; declare the following header files.

#include "WinConSDK.h"

#include "i8094H.h"

On the **Tools** menu, click **Options**. The **Options** popup menu will appears. Select menu **Project**->**Setting**, will bring up a dialog box as below, click on tab **Link**, key in **WinConSDK.lib i8094.lib**(showing as below) into the **Object/library modules** box and the click **OK**.



Category: General

Output file name: ARMV4Dbg/i8094Htest.exe

Object/library modules: WinConSDK.lib i8094H.lib

☑ Generate debug info ☐ Ignore all default libraries

☐ Generate mapfile

Project Options:

```
WinConSDK.lib i8094H.lib /nologo /base:"0x00010000"
/stack:0x10000,0x1000 /entry:"wWinMainCRTStartup"
/incremental:yes /pdb:"ARMV4Dbg/i8094Htest.pdb"
```

4.2 WinCon Microsoft Visual Studio .NET 2003(VB.NET，C#)

Reserved

4.3 I-8000 Turbo C++

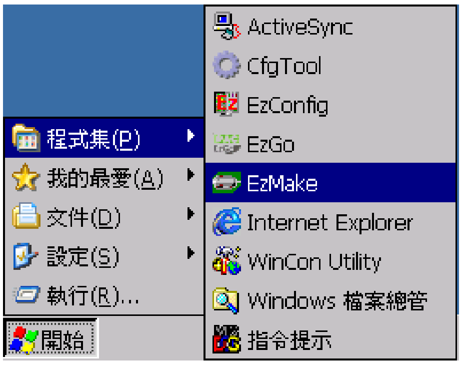
Reserved

5 MPTool : EzMake

5.1 Start EzMake

To start your EzMake, you could:

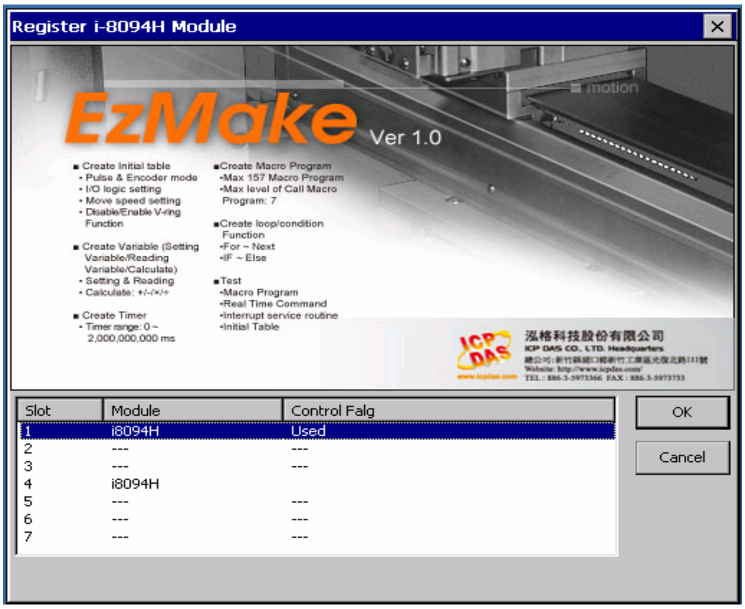
1. **Start→Programs→ EzMake**, click on **EzMake** to start the program.
2. Go to **\CompactFlash\EzProg-I\EzMake\EzMake.exe**, double click on the file **EzMake.exe** to start the program.


ActiveSync
CfgTool
EzConfig
EzGo
EzMake
Internet Explorer
WinCon Utility
Windows 檔案總管
指令提示
程式集(P)
我的最愛(A)
文件(D)
設定(S)
執行(R)...
開始

5.2 Specify the I-8094H to be used

All the **I-8094H** modules will be display on **EzMake** default page, select the I-8094H in use and click on **OK**.

Note: the **I-8094H** in use will display **Used.**

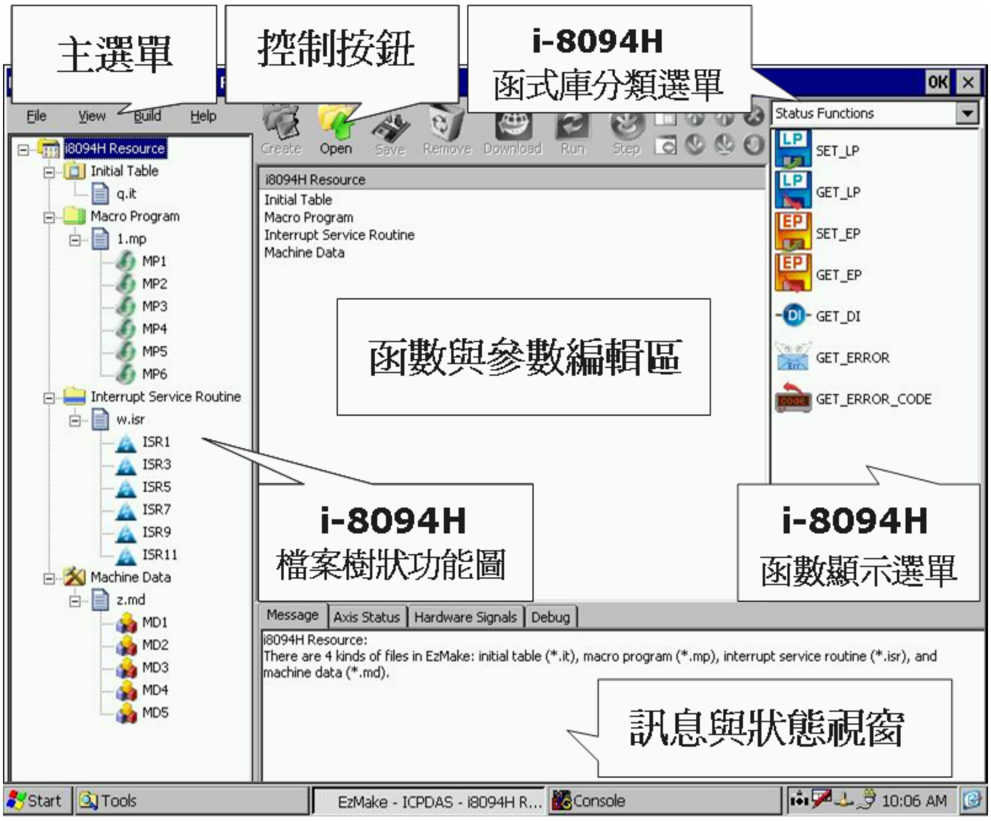

Register i-8094H Module
EzMake
Ver 1.0
■ Create Initial table
• Pulse & Encoder mode
• I/O logic setting
• Move speed setting
• Disable/Enable V-ring Function
■ Create Variable (Setting Variable/Reading Variable/Calculate)
• Setting & Reading
• Calculate: +/-/×/÷
■ Create Timer
• Timer range: 0 ~ 2,000,000,000 ms
■Create Macro Program
•Max 157 Macro Program
•Max level of Call Macro Program: 7
■Create loop/condition Function
•For ~ Next
•IF ~ Else
■Test
•Macro Program
•Real Time Command
•Interrupt service routine
•Initial Table
泓格科技股份有限公司
ICP DAS CO., LTD. Headquarters
OK
Cancel

Slot	Module	Control Falg
1	i8094H	Used
2	---	---
3	---	---
4	i8094H	
5	---	---
6	---	---
7	---	---

Fig. 5.1 EzMake default page

5.3 Operation Page

There are 7 blocks, the general operation order is as follow: Tree Diagram → Main Menu → Control Button →Function Library Groups Menu→Function Display Menu →Function & Parameter Editor →Message & Status

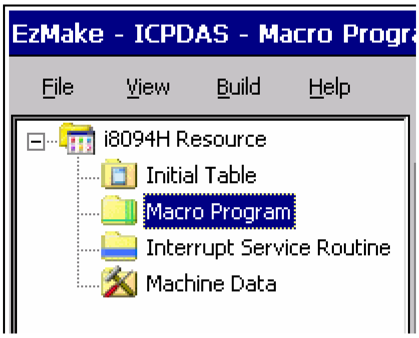

主選單
控制按鈕
i-8094H
函式庫分類選單
File
View
Build
Help
Create
Open
Save
Remove
Download
Run
Step
OK
Status Functions
SET_LP
GET_LP
SET_EP
GET_EP
GET_DI
GET_ERROR
GET_ERROR_CODE
i8094H Resource
Initial Table
q.it
Macro Program
1.mp
MP1
MP2
MP3
MP4
MP5
MP6
Interrupt Service Routine
w.isr
ISR1
ISR3
ISR5
ISR7
ISR9
ISR11
Machine Data
z.md
MD1
MD2
MD3
MD4
MD5
i8094H Resource
Initial Table
Macro Program
Interrupt Service Routine
Machine Data
函數與參數編輯區
i-8094H
檔案樹狀功能圖
i-8094H
函數顯示選單
Message
Axis Status
Hardware Signals
Debug
訊息與狀態視窗
Start
Tools
EzMake - ICPDAS - i8094H R...
Console
10:06 AM

i8094H Resource:
There are 4 kinds of files in EzMake: initial table (*.it), macro program (*.mp), interrupt service routine (*.isr), and machine data (*.md).

5.3.1 Tree Diagram

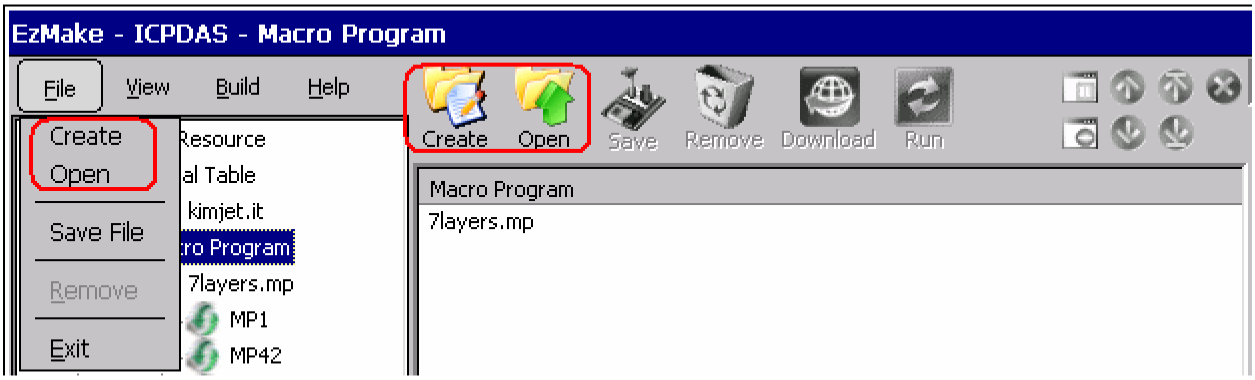
There are four branches under the Tree Diagram

Initial Table: Edit I-8094Hinitial settings
Macro Problem: Create MP
Interrupt Service Routine: Create ISR
Machine Data: Edit data for power outage carry-over


EzMake - ICPDAS - Macro Progr
File
View
Build
Help
i8094H Resource
Initial Table
Macro Program
Interrupt Service Routine
Machine Data

5.3.2 Main Menu

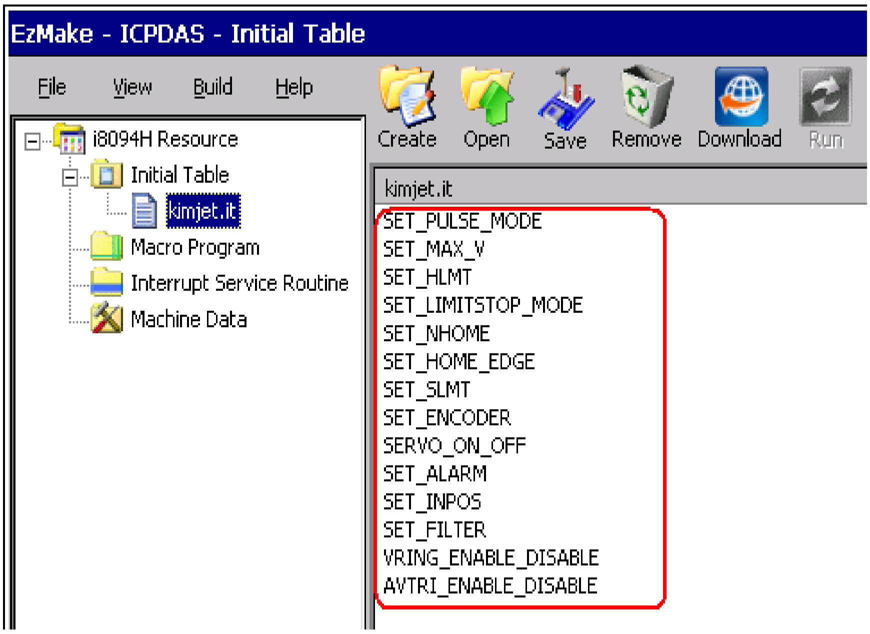
After you select the file type to open or create a file, you could select the operations to be performed from Main Menu or buttons on toolbar.


EzMake - ICPDAS - Macro Program
File
View
Build
Help
Create
Open
Save File
Remove
Exit
Create
Open
Save
Remove
Download
Run
Resource
al Table
kimjet.it
ro Program
7layers.mp
MP1
MP42
Macro Program
7layers.mp

5.3.2.1 Create a File

Please follow the steps to create a file:

In **Initial Table**, you could only edit functions that is displayed in **Functions & Parameters Editor** (Fig. 5.2)


EzMake - ICPDAS - Initial Table
File
View
Build
Help
Create
Open
Save
Remove
Download
Run
i8094H Resource
Initial Table
kimjet.it
Macro Program
Interrupt Service Routine
Machine Data
kimjet.it

SET_PULSE_MODE
SET_MAX_V
SET_HLMT
SET_LIMITSTOP_MODE
SET_NHOME
SET_HOME_EDGE
SET_SLMT
SET_ENCODER
SERVO_ON_OFF
SET_ALARM
SET_INPOS
SET_FILTER
VRING_ENABLE_DISABLE
AVTRI_ENABLE_DISABLE

Fig. 5.2 Initial Table

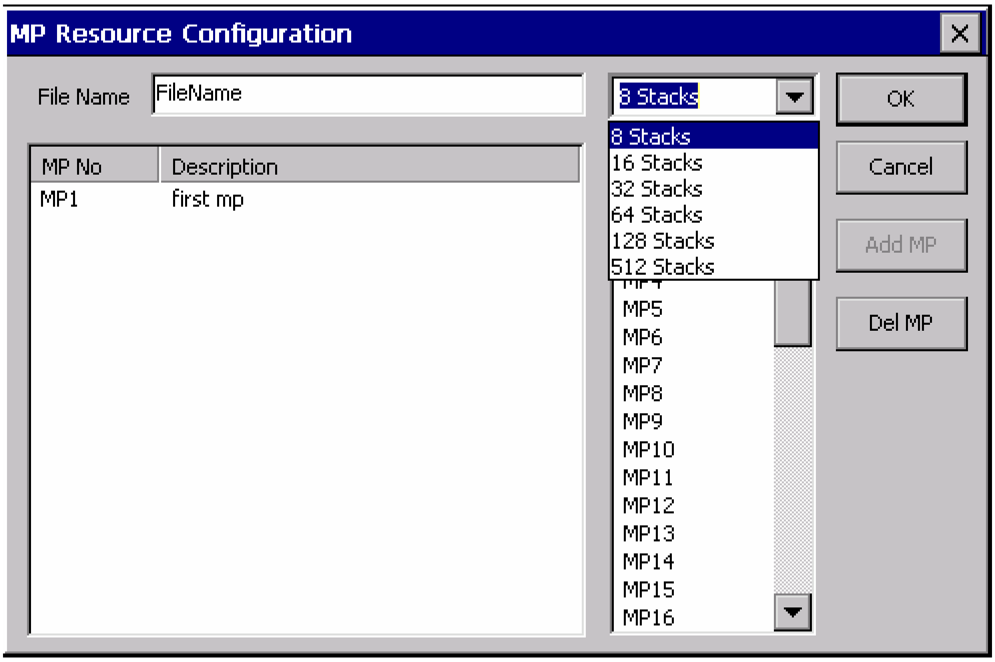
Macro Program & Interrupt Service Routine

1. Input filename (less than 10 characters), as shown in Fig. 5.3

2. Select the MP you would like to add on (MP1~MP157), among158 MP, there are totally 5 categories stacks(8/16/32/128/512), add them according to requirements. For ISR, it is similar to MP, however the number of Functions and ISR are less.

3. You could edit **Description** after you adding on MP.

4. Press **OK** to finish creating file.

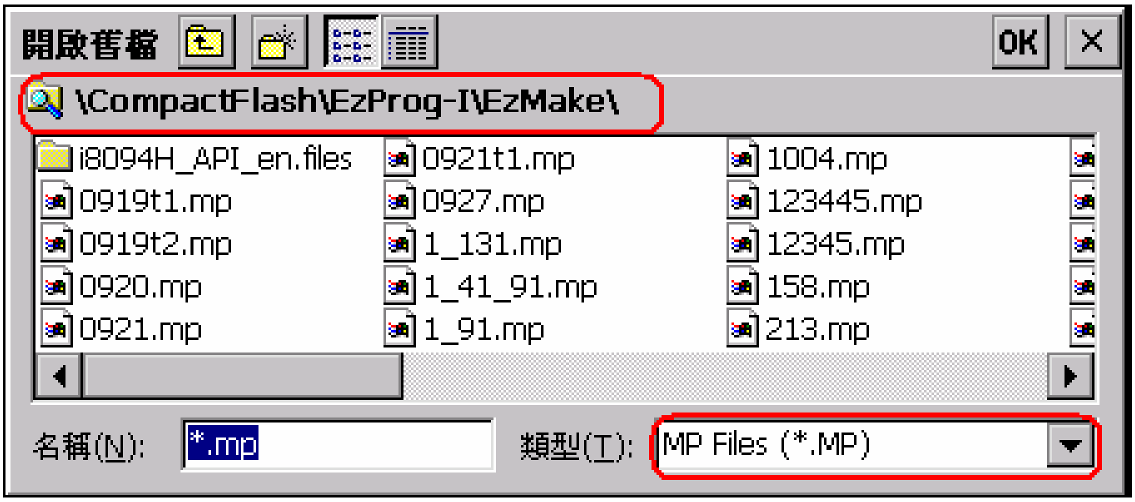

MP Resource Configuration
File Name
FileName
8 Stacks
8 Stacks
16 Stacks
32 Stacks
64 Stacks
128 Stacks
512 Stacks
MP5
MP6
MP7
MP8
MP9
MP10
MP11
MP12
MP13
MP14
MP15
MP16
OK
Cancel
Add MP
Del MP

MP No	Description
MP1	first mp

Fig. 5.3 MP Resouse Configuration

5.3.2.2 Open a file

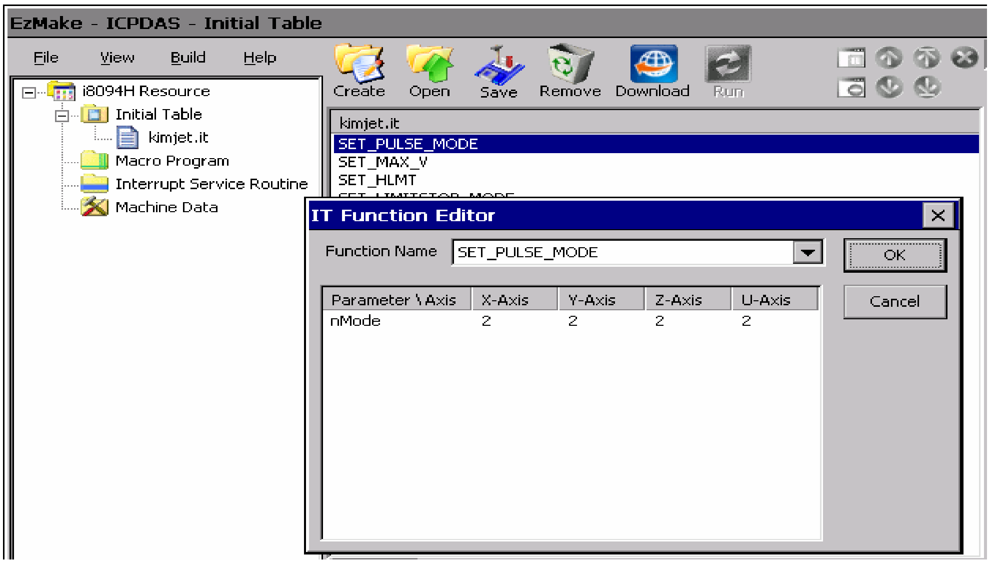
The default path for saving files will be: **CompactFlash\EzProg-I\EzMake\**
If you select MacroProgram in Tree Diagram, you could only open the file with .mp extension name.


開啟舊檔
OK
×
\CompactFlash\EzProg-I\EzMake\
i8094H_API_en.files
0919t1.mp
0919t2.mp
0920.mp
0921.mp
0921t1.mp
0927.mp
1_131.mp
1_41_91.mp
1_91.mp
1004.mp
123445.mp
12345.mp
158.mp
213.mp

名稱(N): *.mp
類型(T): MP Files (*.MP)

5.3.3 Function & Parameter Editor

You could edit the parameters in **Function & Parameter Editor.**

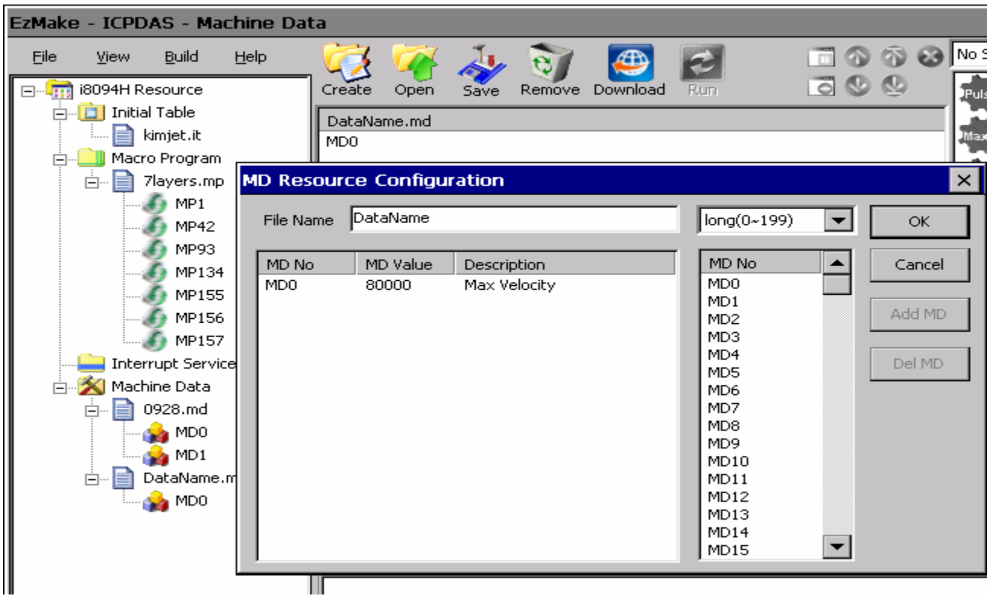

EzMake - ICPDAS - Initial Table
File
View
Build
Help
Create
Open
Save
Remove
Download
Run
i8094H Resource
Initial Table
kimjet.it
Macro Program
Interrupt Service Routine
Machine Data
kimjet.it
SET_PULSE_MODE
SET_MAX_V
SET_HLMT
IT Function Editor
OK
Cancel

Function Name: SET_PULSE_MODE

Parameter \ Axis	X-Axis	Y-Axis	Z-Axis	U-Axis
nMode	2	2	2	2

Fig. 5.4

Fig. 5.4 shows the Initial Table, you could edit the functions displayed, but you could not add or delete the functions. To edit the functions, double click on the function you would like to edit will bring up a editor window, input the parameters you'd like to make a change of. You could also edit Macro Program and Interrupt Service Routine. Note that Machine Data is for data storage, it is different the other three(Fig. 5.5)


EzMake - ICPDAS - Machine Data
File
View
Build
Help
Create
Open
Save
Remove
Download
Run
i8094H Resource
Initial Table
kimjet.it
Macro Program
7layers.mp
MP1
MP42
MP93
MP134
MP155
MP156
MP157
Interrupt Service
Machine Data
0928.md
MD0
MD1
DataName.m
MD0
DataName.md
MD0
MD Resource Configuration
OK
Cancel
Add MD
Del MD

File Name: DataName

long(0~199)

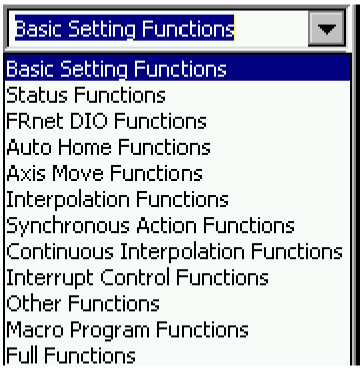
MD No	MD Value	Description
MD0	80000	Max Velocity

MD No
MD0
MD1
MD2
MD3
MD4
MD5
MD6
MD7
MD8
MD9
MD10
MD11
MD12
MD13
MD14
MD15

Fig. 5.5 MD Resource Configuration

5.3.4 Function Library Groups Menu

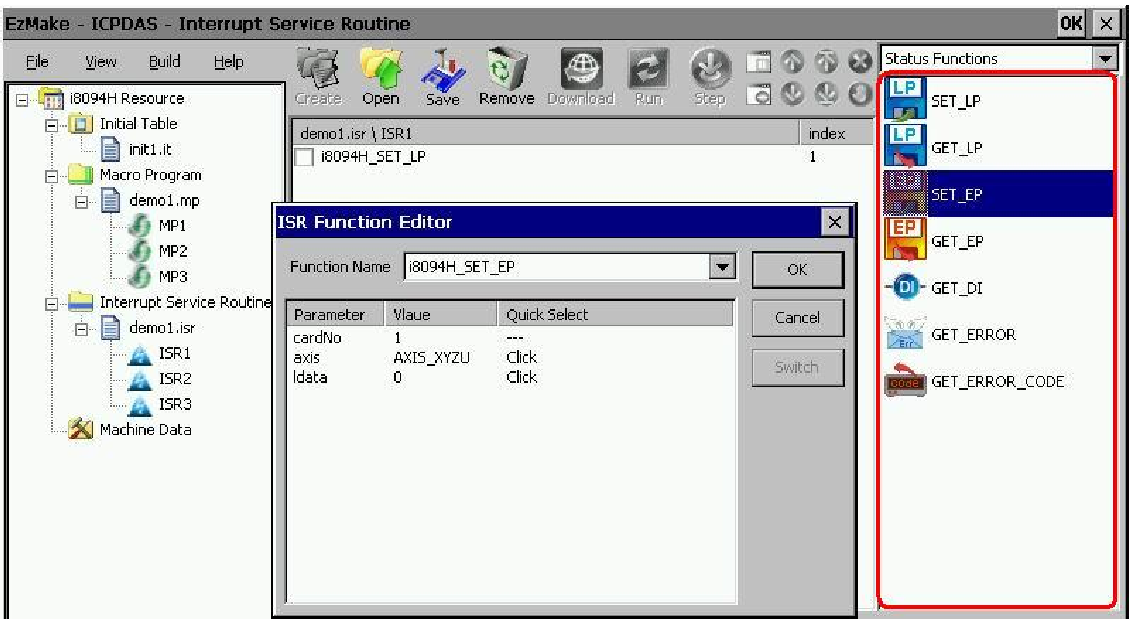
After you create a new file, you could add the functions you need.


Basic Setting Functions
Basic Setting Functions
Status Functions
FRnet DIO Functions
Auto Home Functions
Axis Move Functions
Interpolation Functions
Synchronous Action Functions
Continuous Interpolation Functions
Interrupt Control Functions
Other Functions
Macro Program Functions
Full Functions

In **Function Library Groups Menu**, you could select the Functions by groups or choose the last one (Full Functions) to select all functions.

5.3.5 Function Display Menu

When you click on the Function groups displayed on **Function Library Groups Menu**, it will shows all functions in this group, select the function you'd like to add on and edit its parameters.


EzMake - ICPDAS - Interrupt Service Routine
OK
File
View
Build
Help
Create
Open
Save
Remove
Download
Run
Step
i8094H Resource
Initial Table
init1.it
Macro Program
demo1.mp
MP1
MP2
MP3
Interrupt Service Routine
demo1.isr
ISR1
ISR2
ISR3
Machine Data
Status Functions
SET_LP
GET_LP
SET_EP
GET_EP
GET_DI
GET_ERROR
GET_ERROR_CODE
ISR Function Editor
OK
Cancel
Switch

demo1.isr \ ISR1 | index

☐ i8094H_SET_LP | 1

Function Name: i8094H_SET_EP

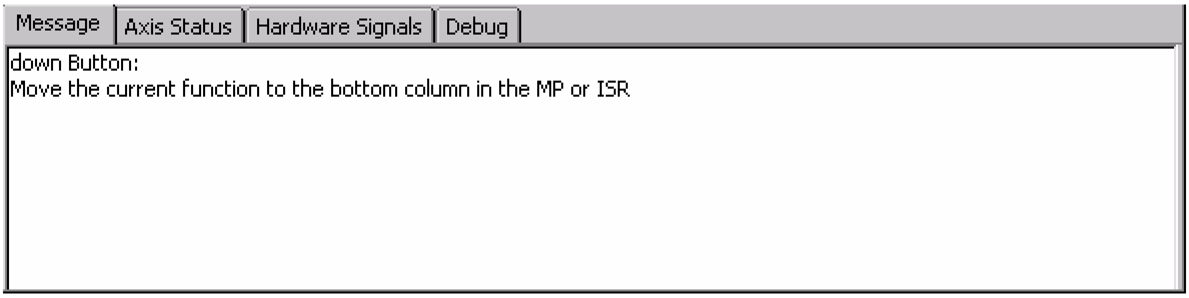
Parameter	Vlaue	Quick Select
cardNo	1	---
axis	AXIS_XYZU	Click
ldata	0	Click

Fig. 5.6

5.3.6 Message & Status

5.3.6.1 Message

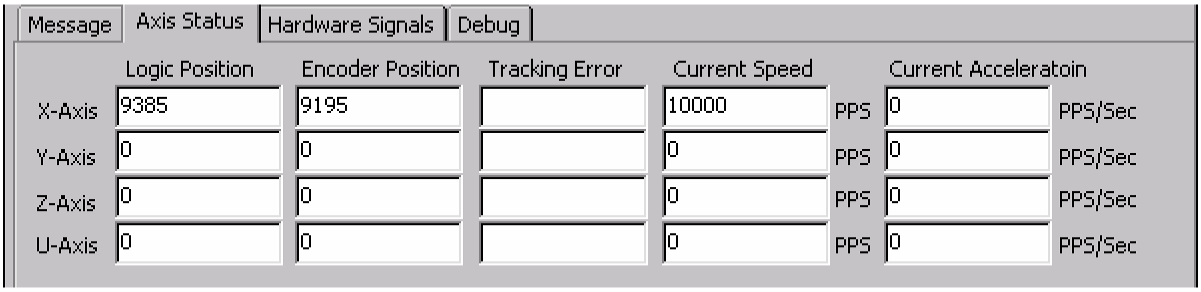
If you place your mouse cursor over any button, the detail function information will be displayed in this window.


Message
Axis Status
Hardware Signals
Debug

down Button:
Move the current function to the bottom column in the MP or ISR

5.3.6.2 Axis Status

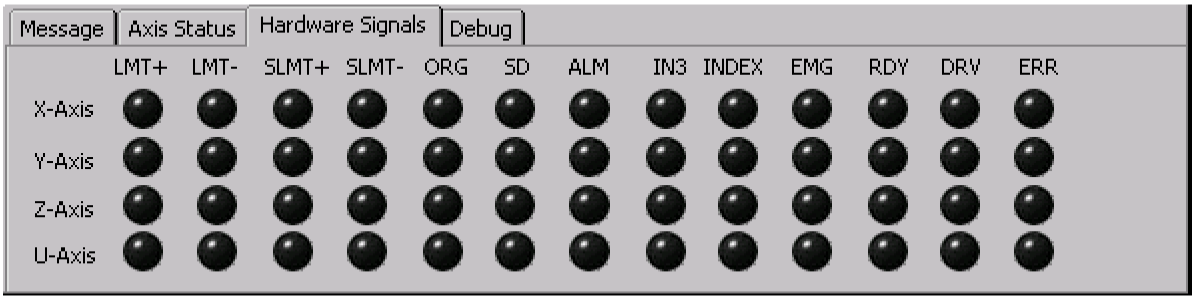
After you execute MP or ISR, various statuses will be shown in the window.


Message
Axis Status
Hardware Signals
Debug

	Logic Position	Encoder Position	Tracking Error	Current Speed		Current Acceleratoin	
X-Axis	9385	9195		10000	PPS	0	PPS/Sec
Y-Axis	0	0		0	PPS	0	PPS/Sec
Z-Axis	0	0		0	PPS	0	PPS/Sec
U-Axis	0	0		0	PPS	0	PPS/Sec

5.3.6.3 Hardware Signals

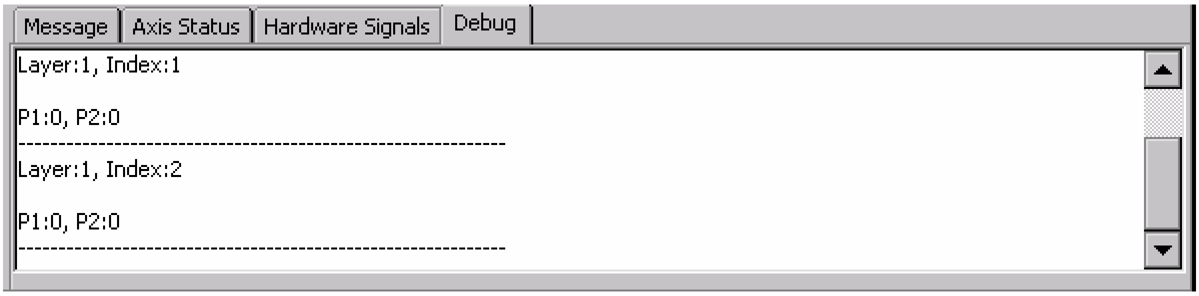
After you execute MP or ISR, the corresponding LED indicators for Axes statuses and locations will be light-on.


Message
Axis Status
Hardware Signals
Debug

	LMT+	LMT-	SLMT+	SLMT-	ORG	SD	ALM	IN3	INDEX	EMG	RDY	DRV	ERR
X-Axis	●	●	●	●	●	●	●	●	●	●	●	●	●
Y-Axis	●	●	●	●	●	●	●	●	●	●	●	●	●
Z-Axis	●	●	●	●	●	●	●	●	●	●	●	●	●
U-Axis	●	●	●	●	●	●	●	●	●	●	●	●	●

5.3.6.4 Debug

After you execute MP or ISR, this window will display the location where the executed functions being made a change of.


Message
Axis Status
Hardware Signals
Debug

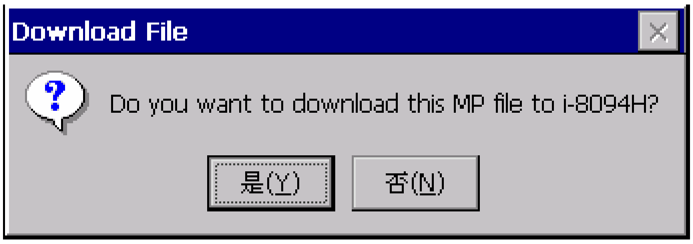
```
Layer:1, Index:1

P1:0, P2:0
--------------------------------------------------------------
Layer:1, Index:2

P1:0, P2:0
--------------------------------------------------------------
```

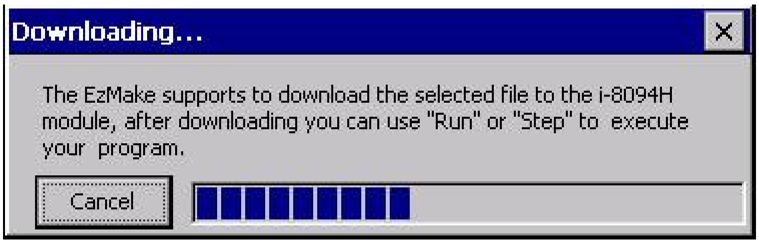
5.4 Download files and programs execution

5.4.1 Download the file


Download File
是(Y)
否(N)

Do you want to download this MP file to i-8094H?

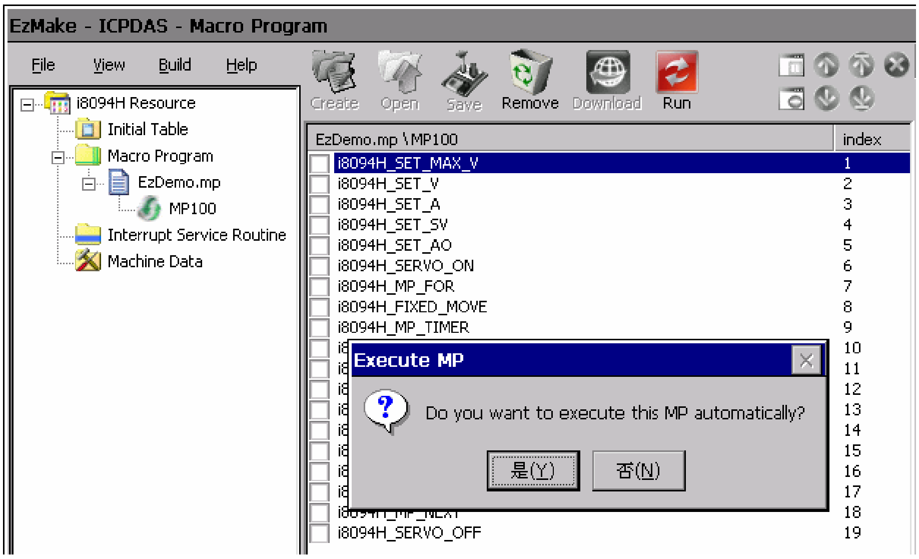
Select the file(*.it/*.mp/*.isr/*.md) you'd like to download, click Download to download the program (Fig. 5.7)


Downloading...
Cancel

The EzMake supports to download the selected file to the i-8094H module, after downloading you can use "Run" or "Step" to execute your program.

Fig. 5.7 Downloading

5.4.2 Program execution


EzMake - ICPDAS - Macro Program
File
View
Build
Help
Create
Open
Save
Remove
Download
Run
i8094H Resource
Initial Table
Macro Program
EzDemo.mp
MP100
Interrupt Service Routine
Machine Data
EzDemo.mp \MP100
index
Execute MP
是(Y)
否(N)

EzDemo.mp \MP100	index
☐ i8094H_SET_MAX_V	1
☐ i8094H_SET_V	2
☐ i8094H_SET_A	3
☐ i8094H_SET_SV	4
☐ i8094H_SET_AO	5
☐ i8094H_SERVO_ON	6
☐ i8094H_MP_FOR	7
☐ i8094H_FIXED_MOVE	8
☐ i8094H_MP_TIMER	9
☐ i8	10
☐ i8	11
☐ i8	12
☐ i8	13
☐ i8	14
☐ i8	15
☐ i8	16
☐ i8	17
☐ i8094H_MP_NEXT	18
☐ i8094H_SERVO_OFF	19

Do you want to execute this MP automatically?

Select the files (MPxx/ISRxx) you want to download, click Run, the program will be executed immediately.

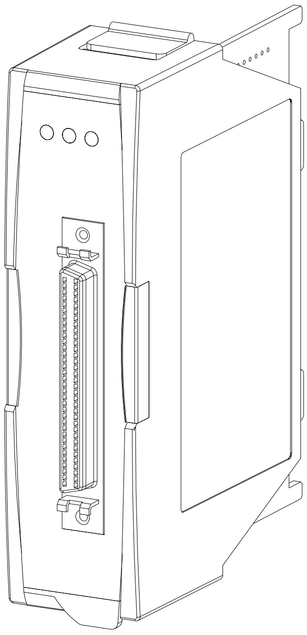
APPENDIX A

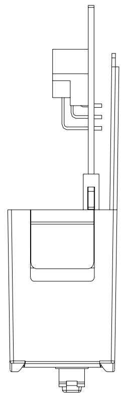
A.1 Setup the Development Environment of I8094A/I8094H

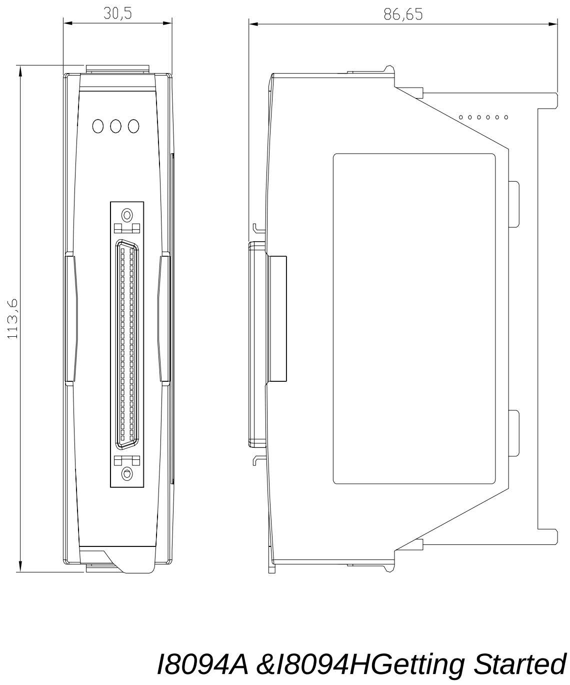
A.1.1 eVC ++ 4.0

1. Microsoft eVC++ 4.0: ServicPack2 or above (current version: ServicPack4)
2. WinCon8000_EVC4_SP1: WinCon in eVC++ Development Environment (SA_IA)
3. WinConSDK:WinCon Software Tool(inc,lib,dll,demo…)

A.2 Appearance and Dimension






30,5
86,65
113,6

APPENDIX B DN-8468 series daughter board

B.1 DN-8468M Daughter Board

The DN-8468M is the daughter board for Mitsubitch J2 Series Amplifier.   It has 4-axis I/O signals.

B.1.1 Board Layout for DN-8468M

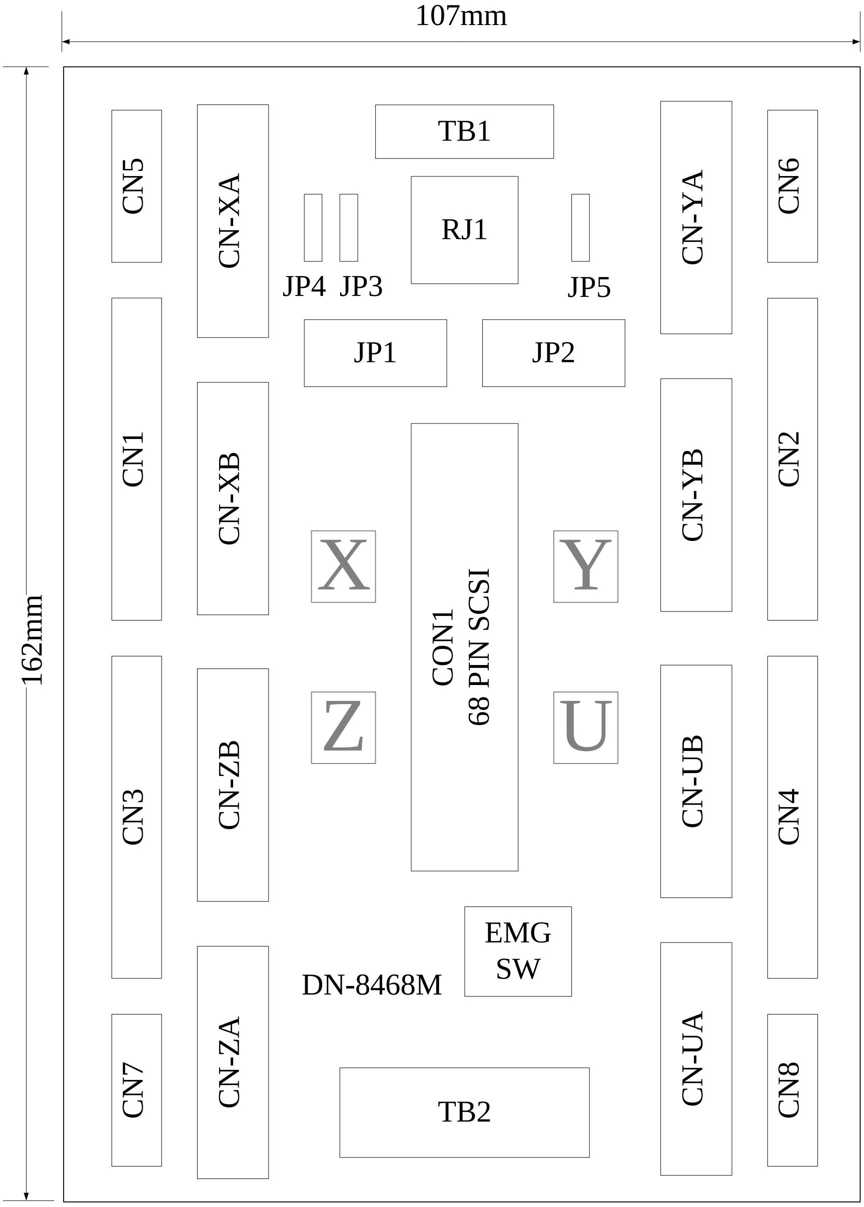

107mm
162mm
CN5
CN-XA
TB1
RJ1
JP4
JP3
JP5
CN-YA
CN6
JP1
JP2
CN1
CN-XB
X
CON1
68 PIN SCSI
Y
CN-YB
CN2
CN3
CN-ZB
Z
U
CN-UB
CN4
EMG
SW
DN-8468M
CN7
CN-ZA
TB2
CN-UA
CN8

Fig. 1-1   Board layout for the DN-8468M

B.1.2 Signal Connections for DN-8468M

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8468M is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1(page 15).

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-3 shows the pin assignment for the 7-pin connector on the DN-8468M, and the Table 1-4 shows its I/O connector signal description.

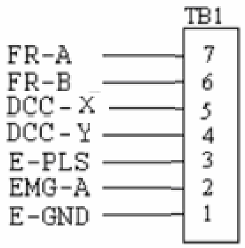
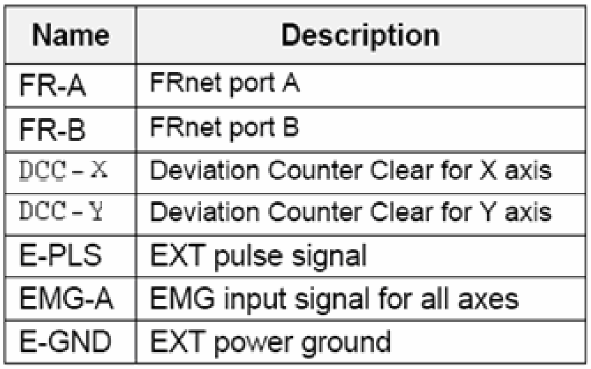


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection



Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-4 shows the pin assignment for the 5-pin connector on the DN-8468M, and the Table 1-5 shows its I/O connector signal description.

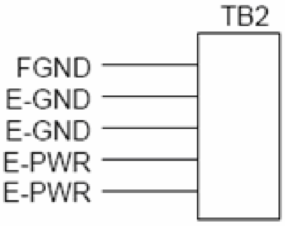
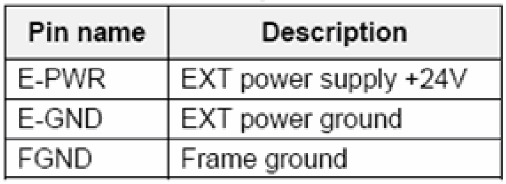


Table 1-5 TB2 Signal Connection



Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

Fig. 1-4 Pin definition for TB2

▶ **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CN-XA, CN-YA, CN-ZA, CN-UA (CNA connector for each AXIS)

The connectors CN-XA, CN-YA, CN-ZA, and CN-UA are 20-pin connectors that enable you to connect to the CNA connector of Mitsubishi motor drivers. Fig.1-5 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-6 shows its I/O connector signal description.

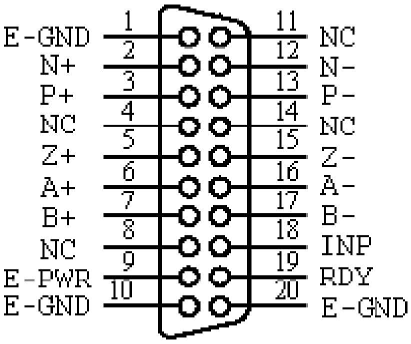


Fig. 1-5 Pin definition for CN-XA, CN-YA, CN-ZA, CN-UA

Table 1-6 CNA Signal Connection

Name	Number	Description
A+	6	Encoder A-Phase (+)
A-	16	Encoder A-Phase (-)
B+	7	Encoder B-Phase (+)
B-	17	Encoder B-Phase (-)
Z+	5	Encoder Z-Phase (+)
Z-	15	Encoder Z-Phase (-)
P+	3	Positive Direction Pulse Output(+)
P-	13	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	12	Negative Direction Pulse Output(-)
INP	18	Servo In Position
RDY	19	Servo Ready
E-PWR	9	EXT power +24V
E-GND	1, 10, 20	EXT power ground
NC	4,8,11,14	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CN-XA and the other is from CN5. In Y axis, one is from CN-YA and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CN-ZA and CN7 at the same time. In U axis, do not connect CN-UA and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN-XB, CN-YB, CN-ZB, CN-UB (CNB connector for each AXIS)

The connectors CN-XB, CN-YB, CN-ZB, and CN-UB are 20-pin connectors that enable you to connect to the CNB connector of your motor drivers. Fig.1-6 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-7 shows its I/O connector signal description.

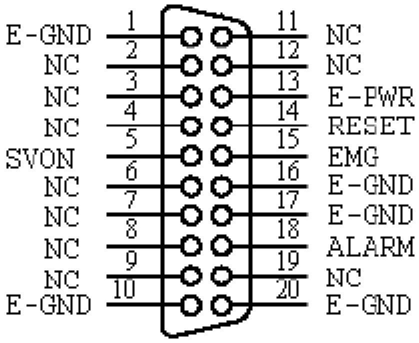
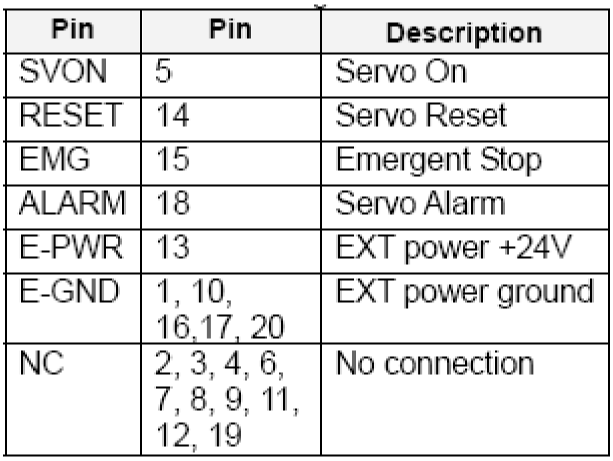

E-GND
NC
NC
NC
SVON
NC
NC
NC
NC
E-GND
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
NC
NC
E-PWR
RESET
EMG
E-GND
E-GND
ALARM
NC
E-GND

Fig. 1-6 Pin definition for CN-XB, CN-YB
CN-ZB, CN-UB

Table 1-7 CNB Signal Connection



Pin	Pin	Description
SVON	5	Servo On
RESET	14	Servo Reset
EMG	15	Emergent Stop
ALARM	18	Servo Alarm
E-PWR	13	EXT power +24V
E-GND	1, 10, 16,17, 20	EXT power ground
NC	2, 3, 4, 6, 7, 8, 9, 11, 12, 19	No connection

▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.1-7 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-8 shows its I/O connector signal description.

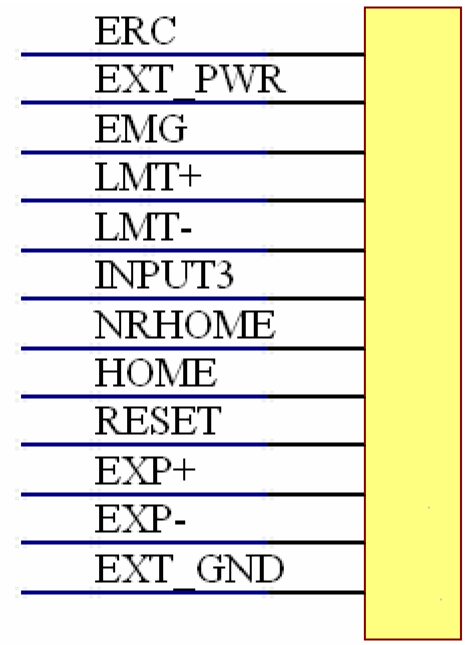


Fig 1-7 Pin definition for CN1~ CN4

Table 1-8 CN1~4 Signal Connection

Name	Number	Description
ERC	12	Error Count Clear
EXT_PWR	11	EXT POWER 24V
EMG	10	Emergent Stop
LMT+	9	Limit switch Input Signal(+)
LMT-	8	Limit switch Input Signal(-)
INPUT3	7	Input Signal (IN3)
NRHOME	6	Near HOME Sensor Input Signal
HOME	5	HOME Sensor Input Signal
RESET	4	RESET Input Signal
EXP+	3	EXT Positive Direction Pulse(+)
EXP-	2	EXT Positive Direction Pulse(-)
EXT_GND	1	EXT POWER Ground

■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.1-8 shows the pin assignment for the 15-pin connector on the DN-8468M, and the Table 1-9 shows its I/O connector signal description.

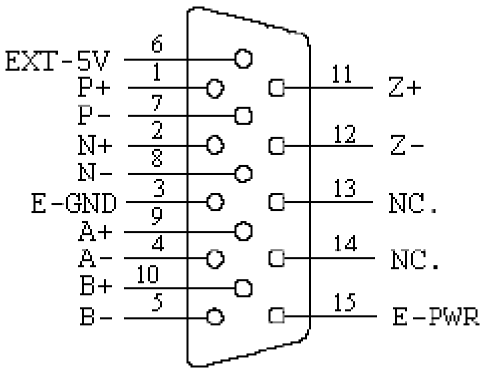
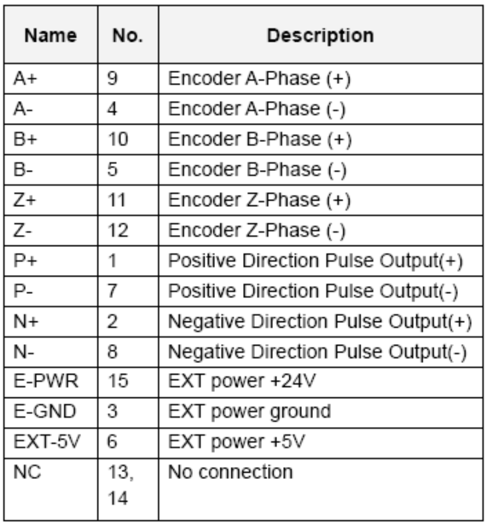
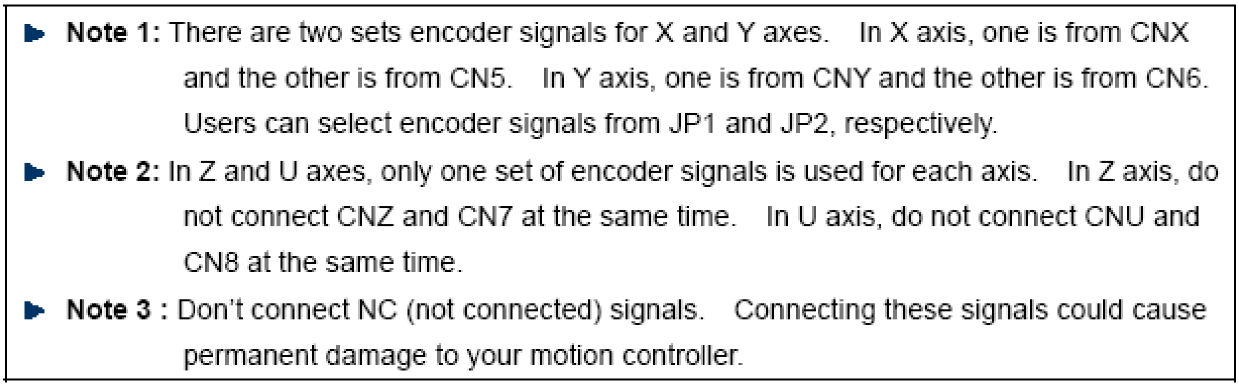


Fig. 1-8 Pin definition for CN5~CN8

Table 1-9 CN5~8



Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection



- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.1-9 shows the pin assignment for the 8-pin connector on the DN-8468M, and the Table 1-10 shows its I/O connector signal description.

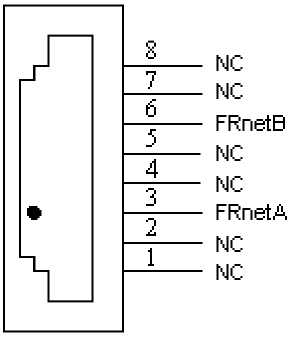


Table 1-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

Fig. 1-9 Pin definition for RJ1

► **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.1.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

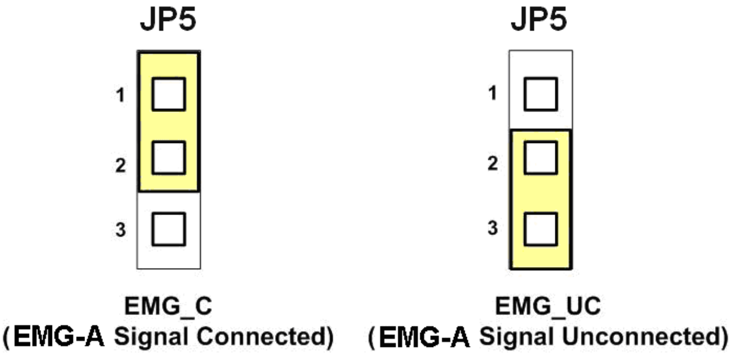

JP5
1
2
3
EMG_C
(EMG-A Signal Connected)
JP5
1
2
3
EMG_UC
(EMG-A Signal Unconnected)

Fig. 1-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 1-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 1-12 shows that the encoder signals are selected from external encoder.

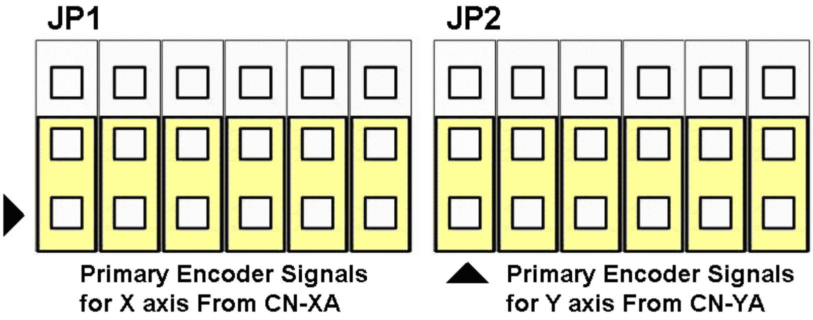

JP1
JP2
Primary Encoder Signals
for X axis From CN-XA
Primary Encoder Signals
for Y axis From CN-YA

Fig. 1-11 Primary encoder signals setting

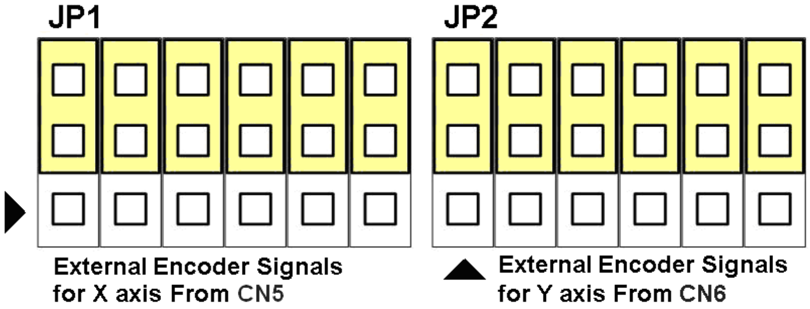

JP1
JP2
External Encoder Signals
for X axis From CN5
External Encoder Signals
for Y axis From CN6

Fig. 1-12 External encoder signals setting

■ EMG SW

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 1-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 1-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

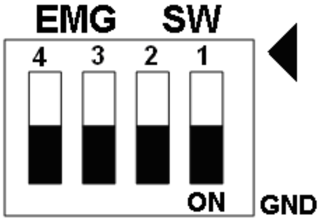


Fig. 1-13 EMG SW setting for normally GND (Default setting)

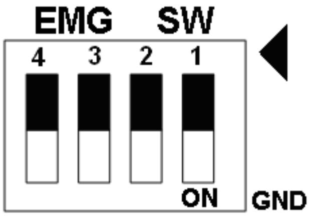


Fig. 1-14 EMG SW setting for user controlled signals.

B.2 DN-8468P Daughter Board

The DN-8468P is the daughter board for Panasonic A4 Series Ampilifier. It has 4-axis I/O signals.

B.2.1 Board Layout for DN-8468P

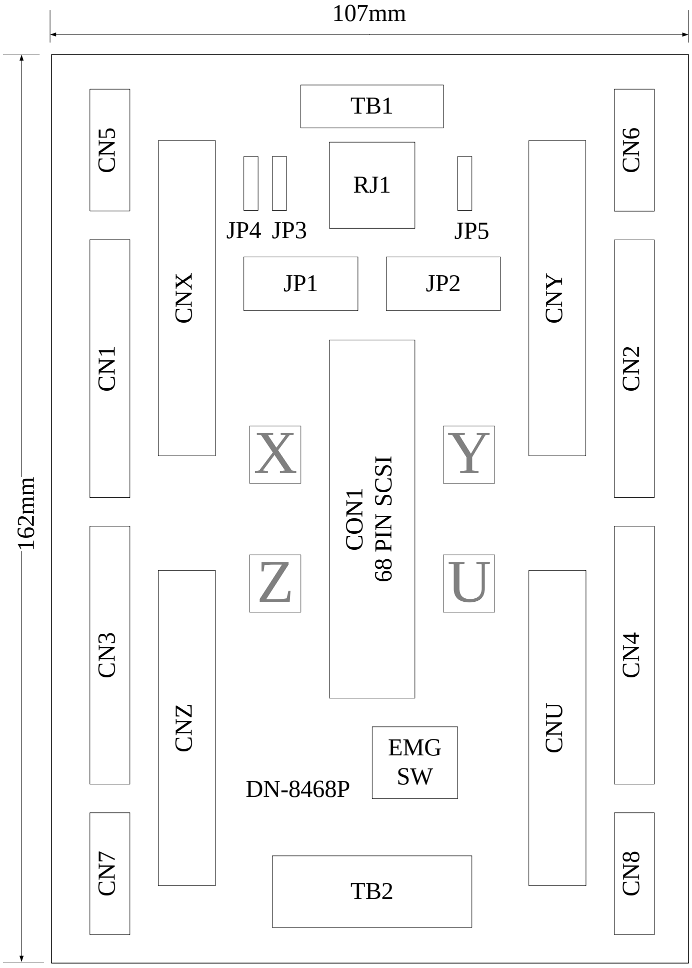

107mm
162mm
TB1
CN5
CN6
RJ1
JP4
JP3
JP5
JP1
JP2
CNX
CNY
CN1
CN2
X
Y
Z
U
CON1
68 PIN SCSI
CN3
CN4
CNZ
CNU
EMG
SW
DN-8468P
CN7
CN8
TB2

Fig. B2-1 Board layout for the DN-8468P

B.2.2 Signal Connections for DN-8468P

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8468P is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1(page 15).

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-3 shows the pin assignment for the 7-pin connector on the DN-8468P, and the Table 1-4 shows its I/O connector signal description.

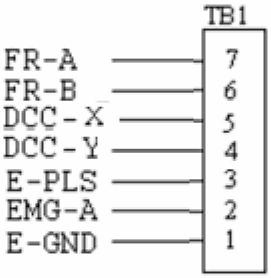
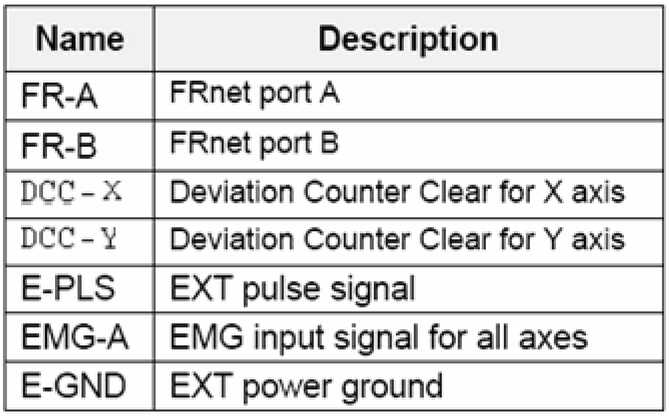


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection



Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-4 shows the pin assignment for the 5-pin connector on the DN-8468P, and the Table 1-5 shows its I/O connector signal description.

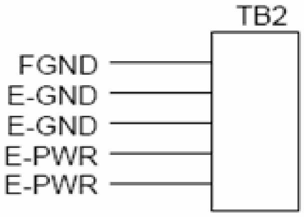
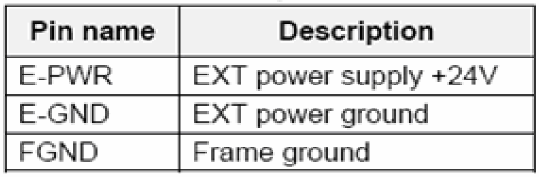


Table 1-5 TB2 Signal Connection



Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

Fig. 1-4 Pin definition for TB2

► **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CNX, CNY, CNZ, CNU (CN X5 connector for each AXIS in Driver)

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN X5 connector of Panasonic motor drivers. Fig.1-5 shows the pin assignment for the 50-pin connector on the DN-8468P, and the Table 1-6 shows its I/O connector signal description.

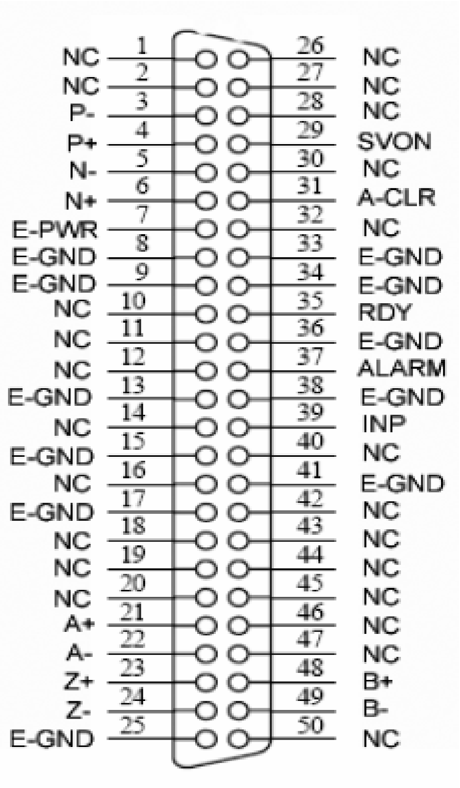

NC 1
NC 2
P- 3
P+ 4
N- 5
N+ 6
E-PWR 7
E-GND 8
E-GND 9
NC 10
NC 11
NC 12
E-GND 13
NC 14
E-GND 15
NC 16
E-GND 17
NC 18
NC 19
NC 20
A+ 21
A- 22
Z+ 23
Z- 24
E-GND 25
26 NC
27 NC
28 NC
29 SVON
30 NC
31 A-CLR
32 NC
33 E-GND
34 E-GND
35 RDY
36 E-GND
37 ALARM
38 E-GND
39 INP
40 NC
41 E-GND
42 NC
43 NC
44 NC
45 NC
46 NC
47 NC
48 B+
49 B-
50 NC

Fig. 1-5 Pin definition for CNX, CNY, CNZ, CNU

Table 1-6 CN X5 Signal Connection

Name	Number	Description
A+	21	Encoder A-Phase (+)
A-	22	Encoder A-Phase (-)
B+	48	Encoder B-Phase (+)
B-	49	Encoder B-Phase (-)
Z+	23	Encoder Z-Phase (+)
Z-	24	Encoder Z-Phase (-)
P+	4	Positive Direction Pulse Output(+)
P-	3	Positive Direction Pulse Output(-)
N+	6	Negative Direction Pulse
N-	5	Negative Direction Pulse Output(-)
INP	39	Servo In Position
RDY	35	Servo Ready
SVON	29	Servo On
A-CLR	31	Alarm Clear
ALARM	37	Servo Alarm
E-PWR	7	EXT power +24V
E-GND	8, 9, 13, 15,17, 25, 33,34, 36, 38,41	EXT power ground
NC	1,2,10,11, 12,14,16, 18,19,20, 26,27,28, 30,32,40, 42,43,44, 45,46,47, 50	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.1-7 shows the pin assignment for the 20-pin connector on the DN-8468P, and the Table 1-8 shows its I/O connector signal description.

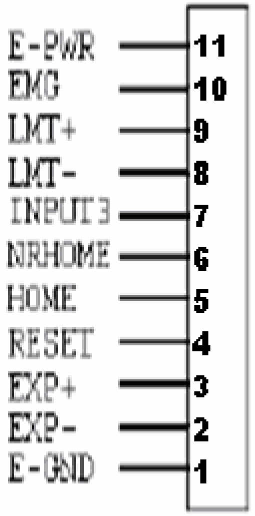
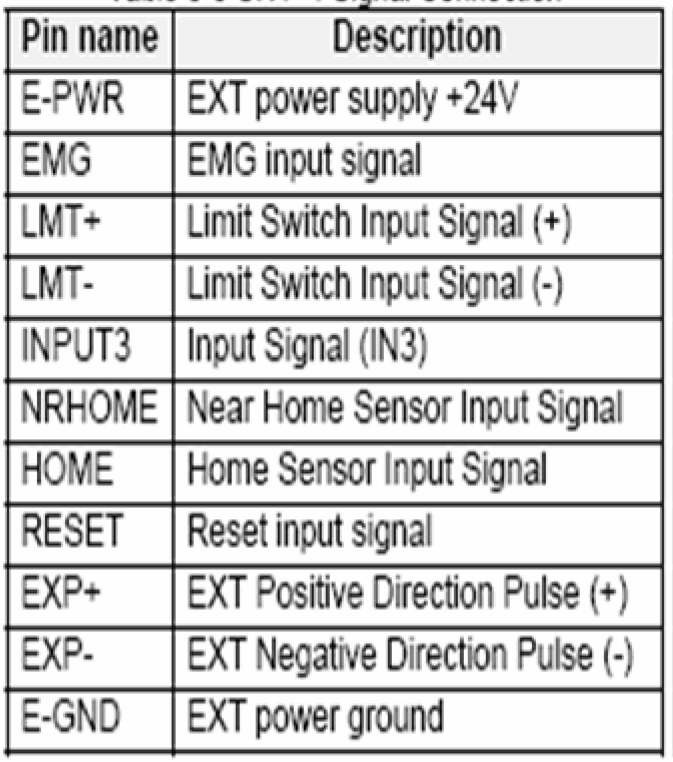


Fig.1-7 Pin definition for CN1 ~ CN4

Table 3-8 CN1~4 Signal Connection



Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.1-8 shows the pin assignment for the 15-pin connector on the DN-8468P, and the Table 1-9 shows its I/O connector signal description.

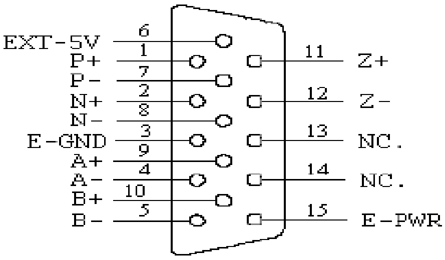


Fig. 1-8 Pin definition for CN5 ~ CN8

Table 1-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- ► **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- ► **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- ► **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.1-9 shows the pin assignment for the 8-pin connector on the DN-8468P, and the Table 1-10 shows its I/O connector signal description.

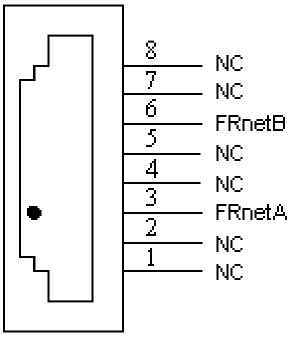
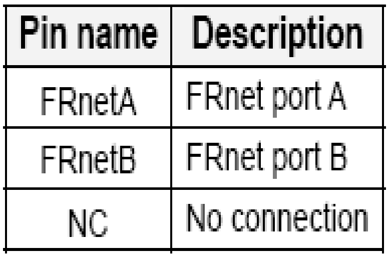


Fig. 1-9 Pin definition for RJ

Table 1-10 RJ1



Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

> ▶ **Note:** Don’t connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.2.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

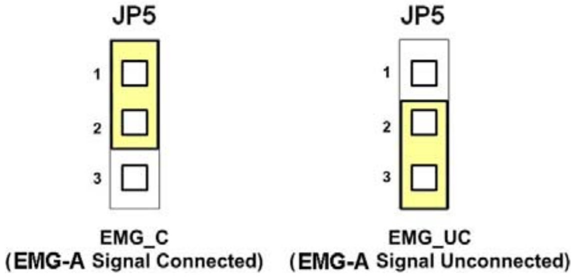

JP5
1
2
3
EMG_C
(EMG-A Signal Connected)
JP5
1
2
3
EMG_UC
(EMG-A Signal Unconnected)

Fig. 1-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 1-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 1-12 shows that the encoder signals are selected from external encoder.

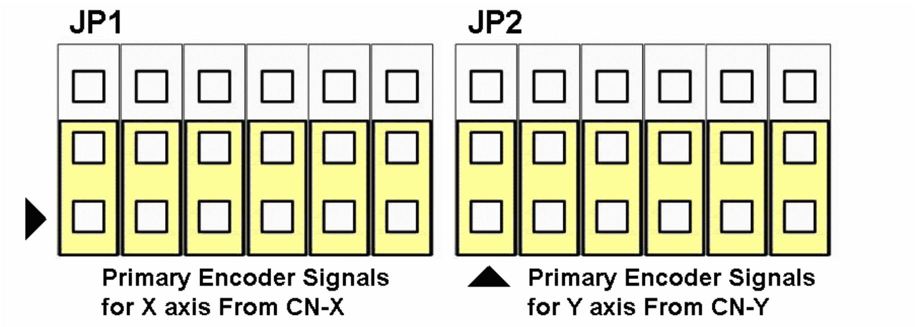

JP1
JP2
Primary Encoder Signals
for X axis From CN-X
Primary Encoder Signals
for Y axis From CN-Y

Fig. 1-11 Primary encoder signals setting

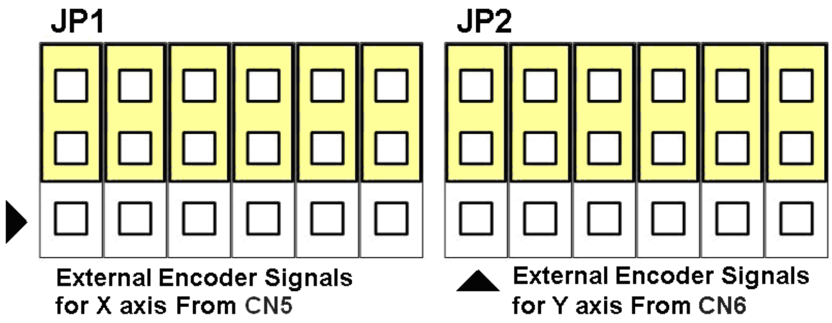

JP1
JP2
External Encoder Signals
for X axis From CN5
External Encoder Signals
for Y axis From CN6

Fig. 1-12 External encoder signals setting

■ EMG SW

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 1-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 1-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

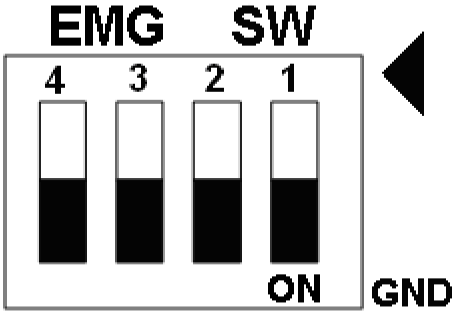


Fig. 1-13 EMG SW setting for normally GND (Default setting)

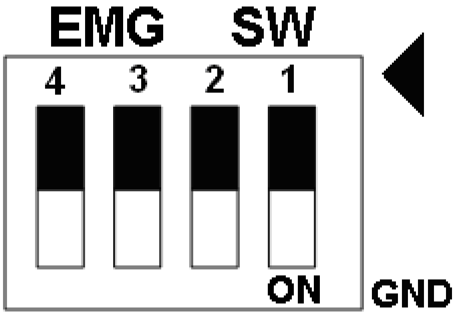


Fig. 1-14 EMG SW setting for user controlled signals.

B.3 DN-8486Y Daughter Board

The DN-8468Y is the daughter board for Yaskawa Ampilifier. It has 4-axis I/O signals.

B.3.1 Board Layout for DN-8468Y

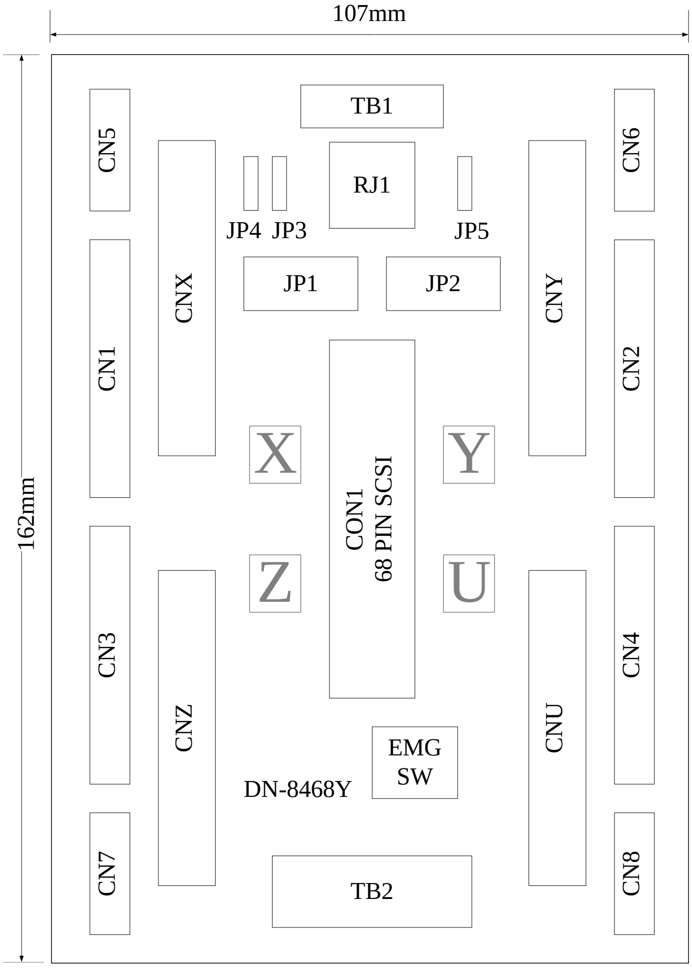

107mm
162mm
TB1
CN5
CN6
RJ1
JP4
JP3
JP5
CNX
CNY
JP1
JP2
CN1
CN2
X
Y
CON1
68 PIN SCSI
Z
U
CN3
CN4
CNZ
CNU
EMG
SW
DN-8468Y
CN7
CN8
TB2

Fig. 3-1 Board layout for the DN-8468Y

B.3.2 Signal Connections for DN-8468Y

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8468Y is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1(page 15).

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-3 shows the pin assignment for the 7-pin connector on the DN-8468Y, and the Table 3-4 shows its I/O connector signal description.

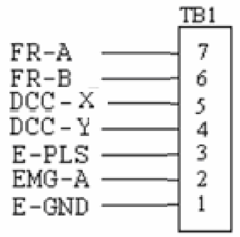
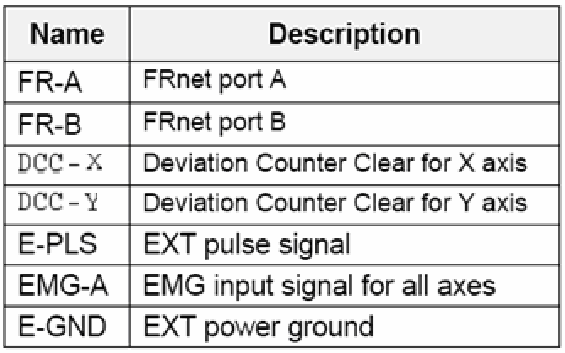


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection



Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-4 shows the pin assignment for the 5-pin connector on the DN-8468Y, and the Table 3-5 shows its I/O connector signal description.

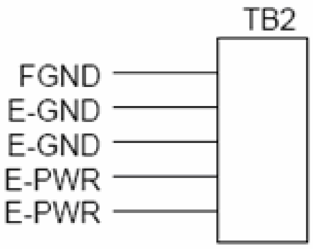
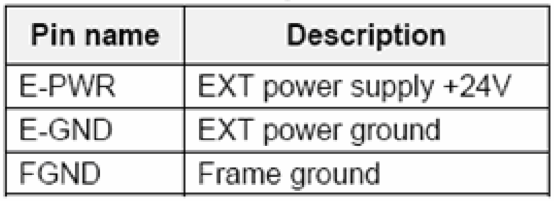


Table 1-5 TB2 Signal Connection



Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

Fig. 1-4 Pin definition for TB2

▶ **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CNX, CNY, CNZ, CNU (CN X5 connector for each AXIS in Driver)

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN X5 connector of Panasonic motor drivers. Fig.3-5 shows the pin assignment for the 50-pin connector on the DN-8468Y, and the Table 3-6 shows its I/O connector signal description.

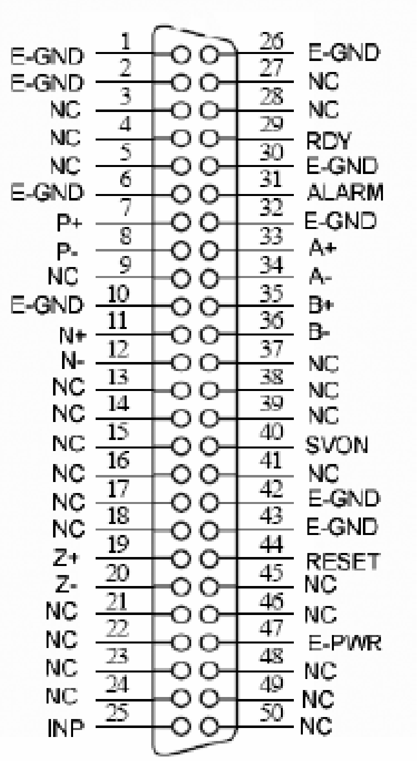
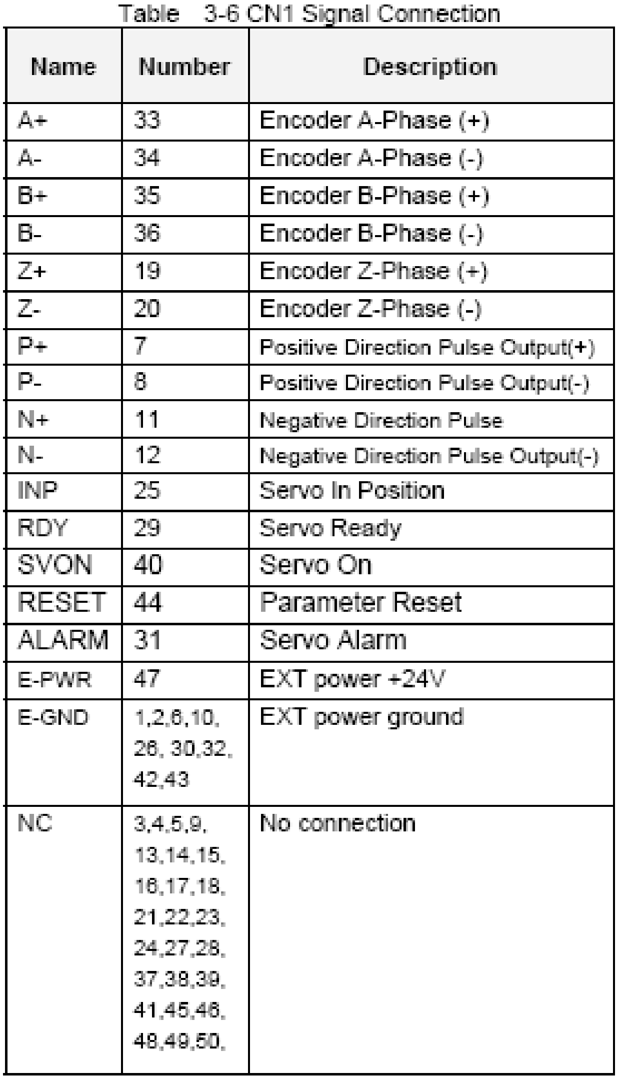

E-GND 1
E-GND 2
NC 3
NC 4
NC 5
E-GND 6
P+ 7
P- 8
NC 9
E-GND 10
N+ 11
N- 12
NC 13
NC 14
NC 15
NC 16
NC 17
NC 18
Z+ 19
Z- 20
NC 21
NC 22
NC 23
NC 24
INP 25
26 E-GND
27 NC
28 NC
29 RDY
30 E-GND
31 ALARM
32 E-GND
33 A+
34 A-
35 B+
36 B-
37 NC
38 NC
39 NC
40 SVON
41 NC
42 E-GND
43 E-GND
44 RESET
45 NC
46 NC
47 E-PWR
48 NC
49 NC
50 NC

Fig. 3-5 Pin definition for CNX, CNY, CNZ, CNU

Table 3-6 CN1 Signal Connection



Name	Number	Description
A+	33	Encoder A-Phase (+)
A-	34	Encoder A-Phase (-)
B+	35	Encoder B-Phase (+)
B-	36	Encoder B-Phase (-)
Z+	19	Encoder Z-Phase (+)
Z-	20	Encoder Z-Phase (-)
P+	7	Positive Direction Pulse Output(+)
P-	8	Positive Direction Pulse Output(-)
N+	11	Negative Direction Pulse
N-	12	Negative Direction Pulse Output(-)
INP	25	Servo In Position
RDY	29	Servo Ready
SVON	40	Servo On
RESET	44	Parameter Reset
ALARM	31	Servo Alarm
E-PWR	47	EXT power +24V
E-GND	1,2,6,10, 26, 30,32, 42,43	EXT power ground
NC	3,4,5,9, 13,14,15, 16,17,18, 21,22,23, 24,27,28, 37,38,39, 41,45,46, 48,49,50.	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-7 shows the pin assignment for the 20-pin connector on the DN-8468Y, and the Table 3-8 shows its I/O connector signal description.

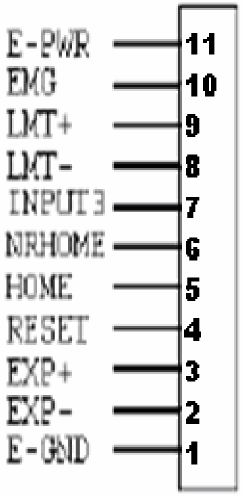
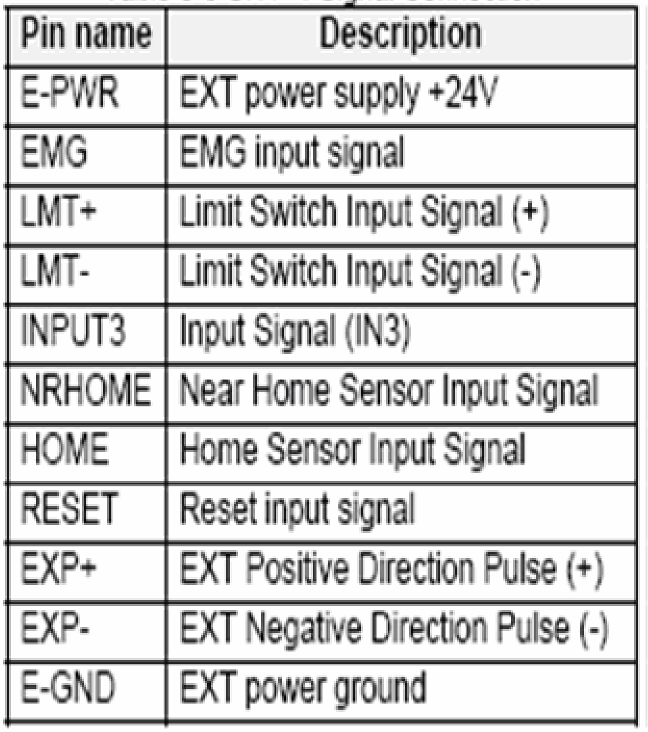


Fig.1 -7 Pin definition for CN1 ~ CN4

Table 3-8 CN1~4 Signal Connection



Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468Y, and the Table 3-9 shows its I/O connector signal description.

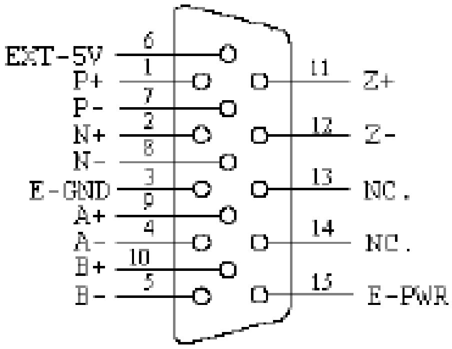


Fig. 3-8 Pin definition for CN5 ~ CN8

Table 3-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.3-9 shows the pin assignment for the 8-pin connector on the DN-8468Y, and the Table 3-10 shows its I/O connector signal description.

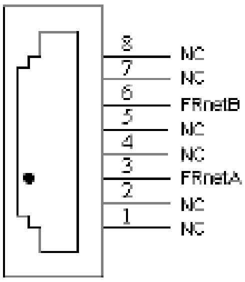


Fig. 3-9 Pin definition for RJ1

Table 3-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

Note: Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.3.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

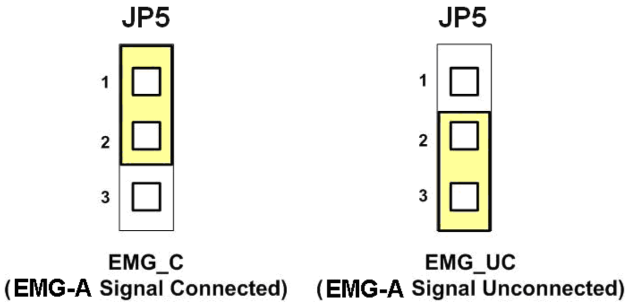

JP5
1
2
3
EMG_C
(EMG-A Signal Connected)
JP5
1
2
3
EMG_UC
(EMG-A Signal Unconnected)

Fig. 3-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

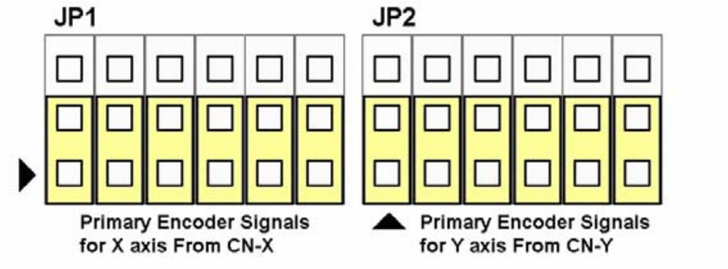

JP1
JP2
Primary Encoder Signals
for X axis From CN-X
Primary Encoder Signals
for Y axis From CN-Y

Fig. 3-11 Primary encoder signals setting

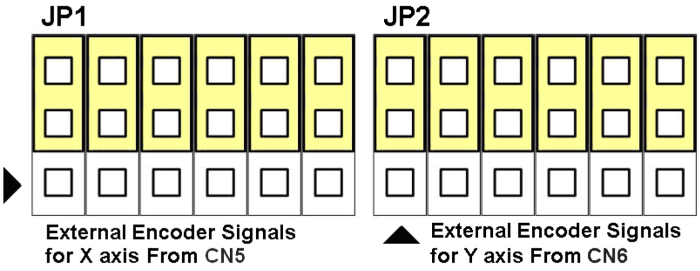

JP1
JP2
External Encoder Signals
for X axis From CN5
External Encoder Signals
for Y axis From CN6

Fig. 3-12 External encoder signals setting

■ EMG SW

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

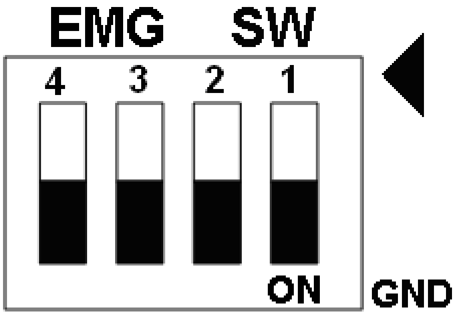


Fig. 3-13 EMG SW setting for normally GND (Default setting)

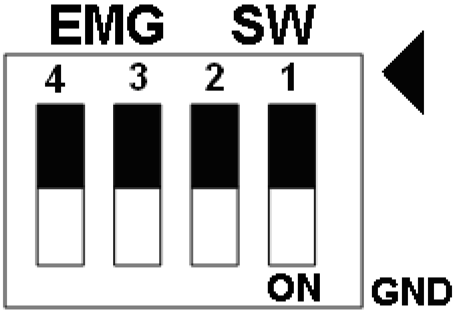


Fig. 3-14 EMG SW setting for user controlled signals.

B.4 DN-8468D Daughter Board

The DN-8468D is the daughter board for Delta ASDA-A Series Ampilifier. It has 4-axis I/O signals.

B.4.1 Board Layout for DN-8468D

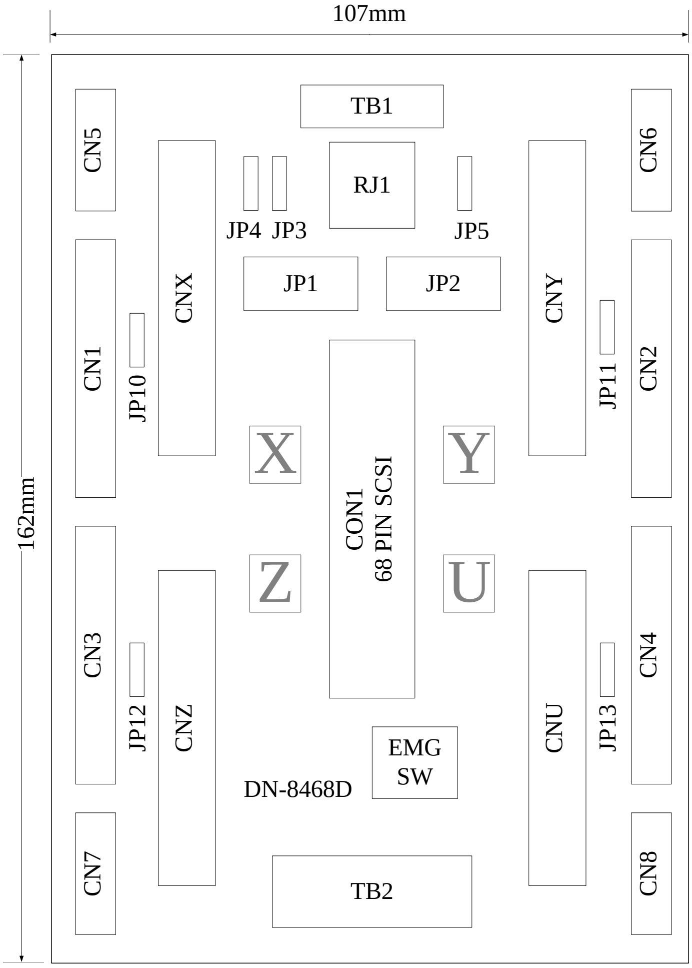

107mm
162mm
TB1
CN5
CN6
RJ1
JP4
JP3
JP5
JP1
JP2
CNX
CNY
CN1
CN2
JP10
JP11
X
Y
CON1
68 PIN SCSI
Z
U
CN3
CN4
JP12
JP13
CNZ
CNU
EMG
SW
DN-8468D
CN7
CN8
TB2

Fig. 3-1 Board layout for the DN-8468D

B.4.2 Signal Connections for DN-8468D

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8468D is a 68-pin SCSI II connector that enables you to connect to the I-8094 motion card. Fig. 3-2 shows the pin assignment for the 68-pin I/O connector on the DN-8468D (or on the I-8094), and refer to Table 3-2, 3-3 for description of each motion I/O signal.

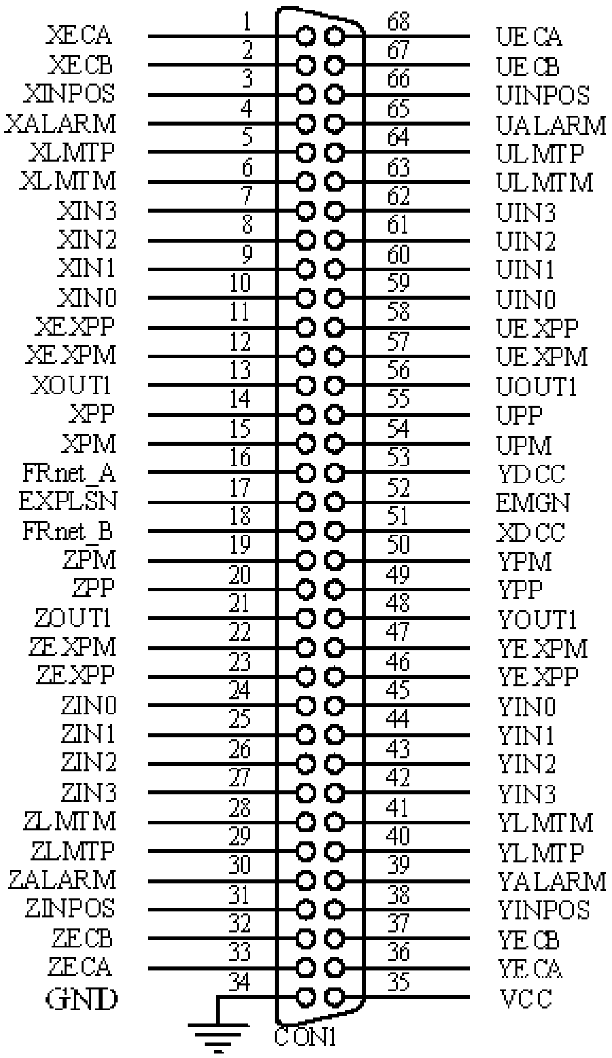

XECA 1 68 UECA
XECB 2 67 UECB
XINPOS 3 66 UINPOS
XALARM 4 65 UALARM
XLMTP 5 64 ULMTP
XLMTM 6 63 ULMTM
XIN3 7 62 UIN3
XIN2 8 61 UIN2
XIN1 9 60 UIN1
XIN0 10 59 UIN0
XEXPP 11 58 UEXPP
XEXPM 12 57 UEXPM
XOUT1 13 56 UOUT1
XPP 14 55 UPP
XPM 15 54 UPM
FRnet_A 16 53 YDCC
EXPLSN 17 52 EMGN
FRnet_B 18 51 XDCC
ZPM 19 50 YPM
ZPP 20 49 YPP
ZOUT1 21 48 YOUT1
ZEXPM 22 47 YEXPM
ZEXPP 23 46 YEXPP
ZIN0 24 45 YIN0
ZIN1 25 44 YIN1
ZIN2 26 43 YIN2
ZIN3 27 42 YIN3
ZLMTM 28 41 YLMTM
ZLMTP 29 40 YLMTP
ZALARM 30 39 YALARM
ZINPOS 31 38 YINPOS
ZECB 32 37 YECB
ZECA 33 36 YECA
GND 34 35 VCC
CON1

Fig. 3-2 I/O connector pin assignment for the CON1

Table 3-2 DN-8468D I/O connector signal description (part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTP	5	Limit switch input signal (+) for X axis
YLMTP	40	Limit switch input signal (+) for Y axis
ZLMTP	29	Limit switch input signal (+) for Z axis
ULMTP	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

Table 3-3 DN-8468D I/O connector signal description (part 2)

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FRnetA	16	FRnet port A
FRnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-3 shows the pin assignment for the 7-pin connector on the DN-8468D, and the Table 3-4 shows its I/O connector signal description.

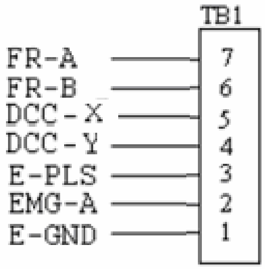
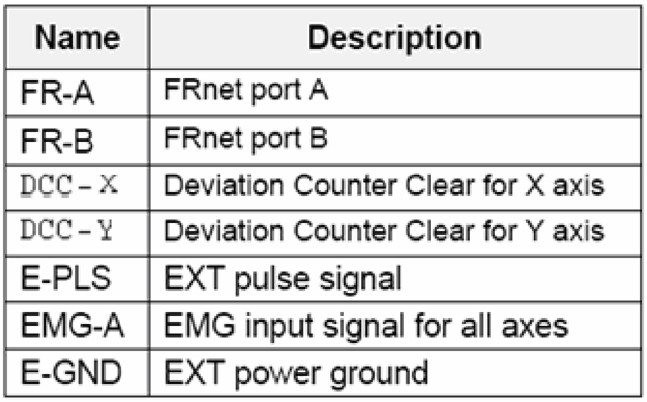


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection



Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-4 shows the pin assignment for the 5-pin connector on the DN-8468D, and the Table 3-5 shows its I/O connector signal description.

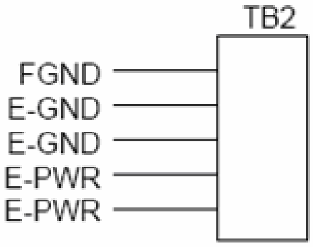
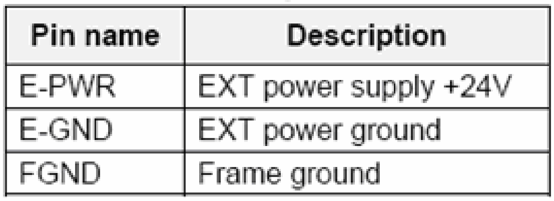


Fig. 1-4 Pin definition for TB2

Table 1-5 TB2 Signal Connection



Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

▶ **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CNX, CNY, CNZ, CNU (CN 1 connector for each AXIS in Driver)

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN1 connector of Delta ASDA-A series motor drivers. Fig.3-5 shows the pin assignment for the 50-pin connector on the DN-8468D, and the Table 3-6 shows its I/O connector signal description.

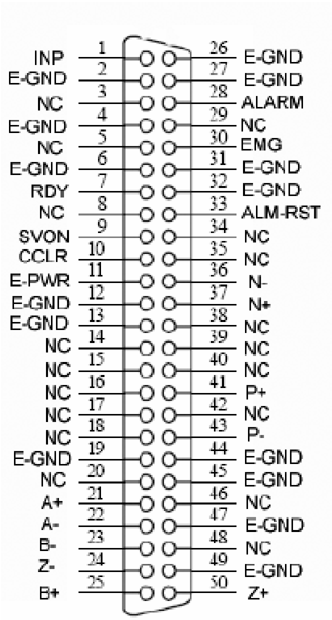

INP 1
E-GND 2
NC 3
E-GND 4
NC 5
E-GND 6
RDY 7
NC 8
SVON 9
CCLR 10
E-PWR 11
E-GND 12
E-GND 13
NC 14
NC 15
NC 16
NC 17
NC 18
E-GND 19
NC 20
A+ 21
A- 22
B- 23
Z- 24
B+ 25
26 E-GND
27 E-GND
28 ALARM
29 NC
30 EMG
31 E-GND
32 E-GND
33 ALM-RST
34 NC
35 NC
36 N-
37 N+
38 NC
39 NC
40 NC
41 P+
42 NC
43 P-
44 E-GND
45 E-GND
46 NC
47 E-GND
48 NC
49 E-GND
50 Z+

Fig. 3-5 Pin definition for CNX, CNY, CNZ, CNU

Table 3-6 CN 1 Signal Connection

Name	Number	Description
A+	21	Encoder A-Phase (+)
A-	22	Encoder A-Phase (-)
B+	25	Encoder B-Phase (+)
B-	23	Encoder B-Phase (-)
Z+	50	Encoder Z-Phase (+)
Z-	24	Encoder Z-Phase (-)
P+	41	Positive Direction Pulse Output(+)
P-	43	Positive Direction Pulse Output(-)
N+	37	Negative Direction Pulse Output(+)
N-	36	Negative Direction Pulse Output(-)
INP	1	Servo In Position
RDY	7	Servo Ready
SVON	9	Servo On
ALM-RST	33	Alarm Reset
CCLR	10	Error Counter Clear
ALARM	28	Servo Alarm
EMG	30	Emergent Stop
E-PWR	11	EXT power +24V
E-GND	2,4,6,12, 13,19,26, 27,31,32, 44,45,47, 49	EXT power ground
NC	3,5,8,14, 15,16,17, 18,20,29, 34,35,38 39,40,42, 46 48	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-7 shows the pin assignment for the 20-pin connector on the DN-8468D, and the Table 3-8 shows its I/O connector signal description.

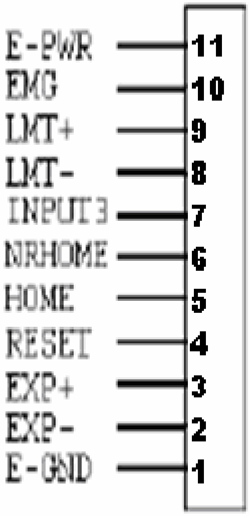
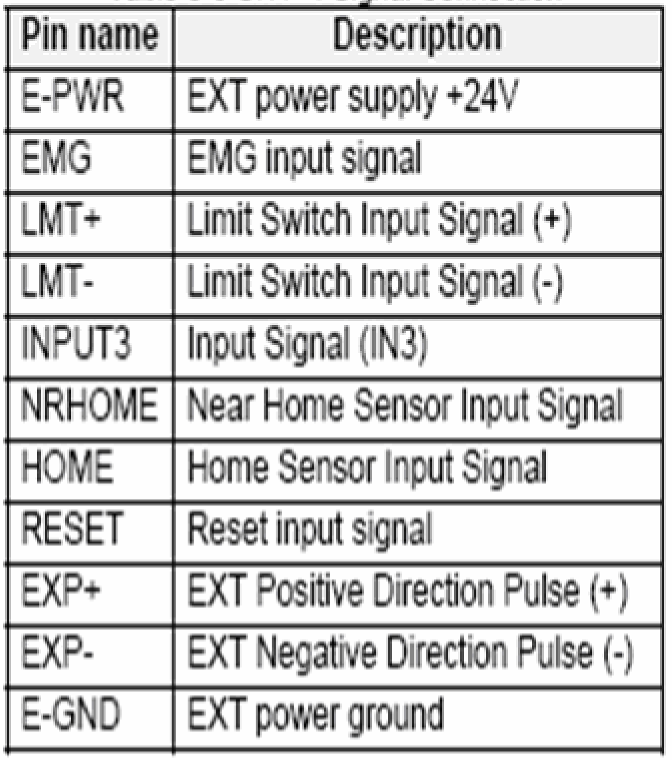


Fig.1-7 Pin definition for CN1 ~ CN4

Table 3-8 CN1~4 Signal Connection



Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468D, and the Table 3-9 shows its I/O connector signal description.

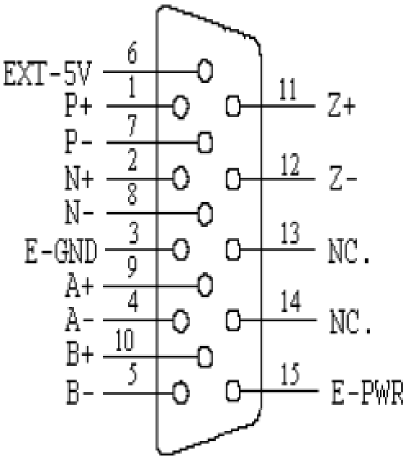


Fig. 3-8 Pin definition for CN5 ~ CN8

Table 3-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.3-9 shows the pin assignment for the 8-pin connector on the DN-8468D, and the Table 3-10 shows its I/O connector signal description.

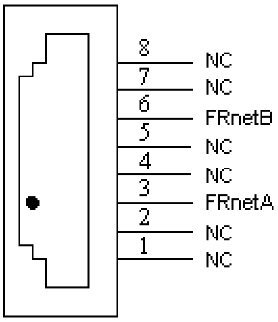


Fig. 3-9 Pin definition for RJ1

Table 3-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

- **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.4.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

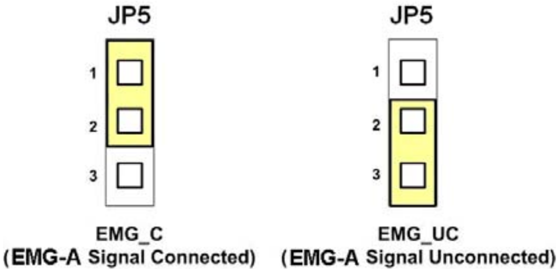

JP5
1
2
3
EMG_C
(EMG-A Signal Connected)
JP5
1
2
3
EMG_UC
(EMG-A Signal Unconnected)

Fig. 3-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

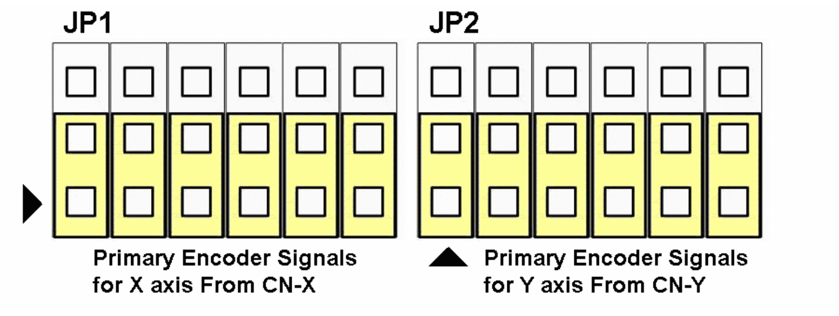

JP1
JP2
Primary Encoder Signals for X axis From CN-X
Primary Encoder Signals for Y axis From CN-Y

Fig. 3-11 Primary encoder signals setting

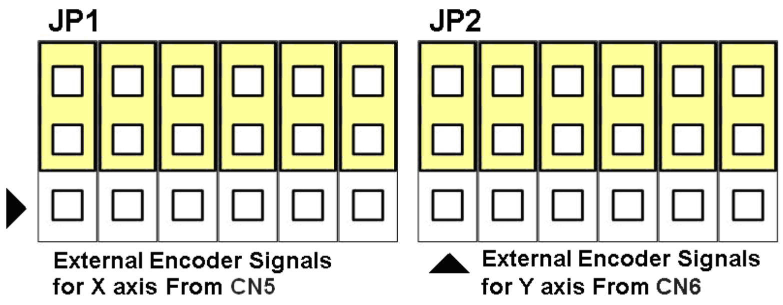

JP1
JP2
External Encoder Signals for X axis From CN5
External Encoder Signals for Y axis From CN6

Fig. 3-12 External encoder signals setting

■ SW1

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1, 2 , 3, 4 on SW1 are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

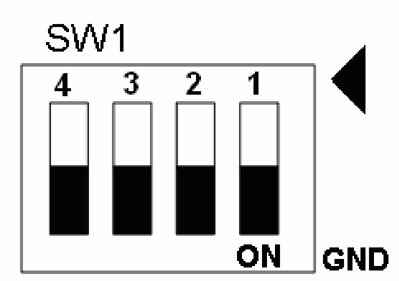

SW1
4
3
2
1
ON
GND

Fig. 3-13 SW1 setting for normally GND (Default setting)

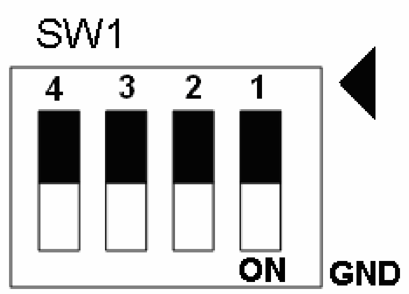

SW1
4
3
2
1
ON
GND

Fig. 3-14 SW1 setting for user controlled signals.

■ JP10 ~ JP13

Jumper 10 ~ Jumper 13 can select the reset function in CN1 ~ CN4 for each axis. The following diagram is shown the selection condition of the JP10.

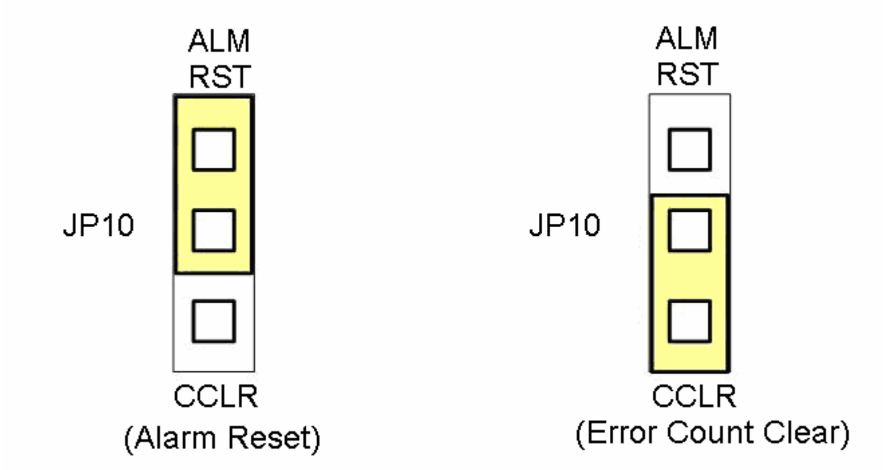

ALM
RST
JP10
CCLR
(Alarm Reset)
ALM
RST
JP10
CCLR
(Error Count Clear)

Fig. 3-15 JP 10 ~ 13 setting

B.5 DN-8468FB Daughter Board

The DN-8468FB is the daughter board for FUJI FALDIC-W Series Ampilifier. It has 4-axis I/O signals.

B.5.1 Board Layout for DN-8468FB

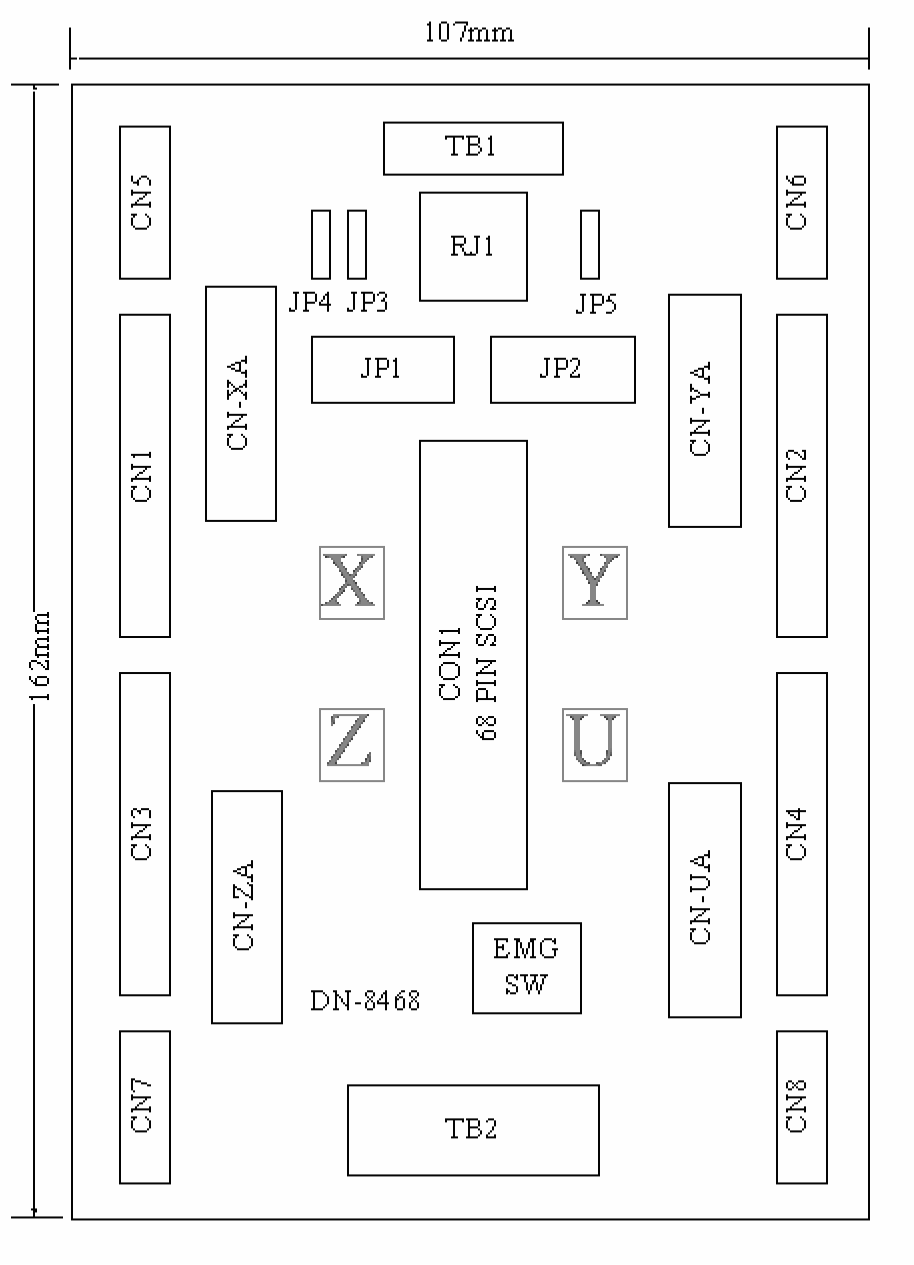

107mm
162mm
TB1
CN5
CN6
RJ1
JP4
JP3
JP5
CN-XA
JP1
JP2
CN-YA
CN1
CN2
X
Y
CON1
68 PIN SCSI
Z
U
CN3
CN4
CN-ZA
CN-UA
EMG
SW
DN-8468
CN7
TB2
CN8

Fig. 3-1 Board layout for the DN-8468FB

B.5.2 Signal Connections for DN-8468FB

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8468FB is a 68-pin SCSI II connector that enables you to connect to the I-8094 motion card. Fig. 3-2 shows the pin assignment for the 68-pin I/O connector on the DN-8468FB (or on the I-8094), and refer to Table 3-2, 3-3 for description of each motion I/O signal.

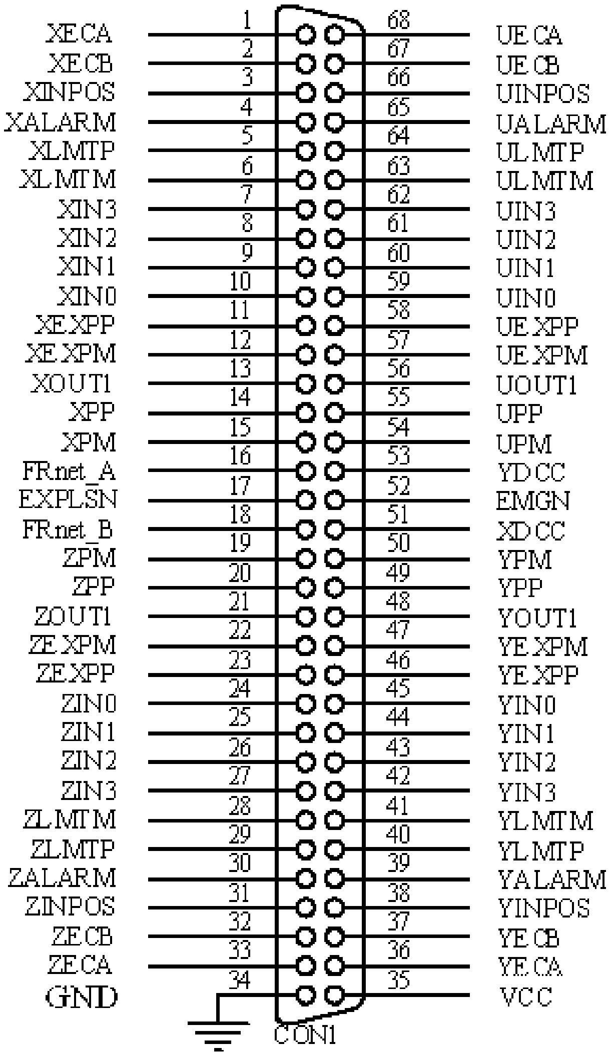

XECA 1 68 UECA
XECB 2 67 UECB
XINPOS 3 66 UINPOS
XALARM 4 65 UALARM
XLMTP 5 64 ULMTP
XLMTM 6 63 ULMTM
XIN3 7 62 UIN3
XIN2 8 61 UIN2
XIN1 9 60 UIN1
XIN0 10 59 UIN0
XEXPP 11 58 UEXPP
XEXPM 12 57 UEXPM
XOUT1 13 56 UOUT1
XPP 14 55 UPP
XPM 15 54 UPM
FRnet_A 16 53 YDCC
EXPLSN 17 52 EMGN
FRnet_B 18 51 XDCC
ZPM 19 50 YPM
ZPP 20 49 YPP
ZOUT1 21 48 YOUT1
ZEXPM 22 47 YEXPM
ZEXPP 23 46 YEXPP
ZIN0 24 45 YIN0
ZIN1 25 44 YIN1
ZIN2 26 43 YIN2
ZIN3 27 42 YIN3
ZLMTM 28 41 YLMTM
ZLMTP 29 40 YLMTP
ZALARM 30 39 YALARM
ZINPOS 31 38 YINPOS
ZECB 32 37 YECB
ZECA 33 36 YECA
GND 34 35 VCC
CON1

Fig. 3-2 I/O connector pin assignment for the CON1

Table 3-2 DN-8468FB I/O connector signal description (part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTP	5	Limit switch input signal (+) for X axis
YLMTP	40	Limit switch input signal (+) for Y axis
ZLMTP	29	Limit switch input signal (+) for Z axis
ULMTP	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

Table 3-3 DN-8468FB I/O connector signal description (part 2)

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FRnetA	16	FRnet port A
FRnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-3 shows the pin assignment for the 7-pin connector on the DN-8468FB, and the Table 3-4 shows its I/O connector signal description.

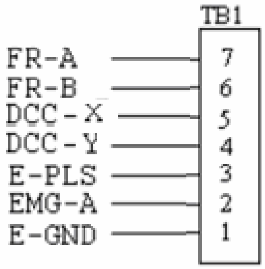
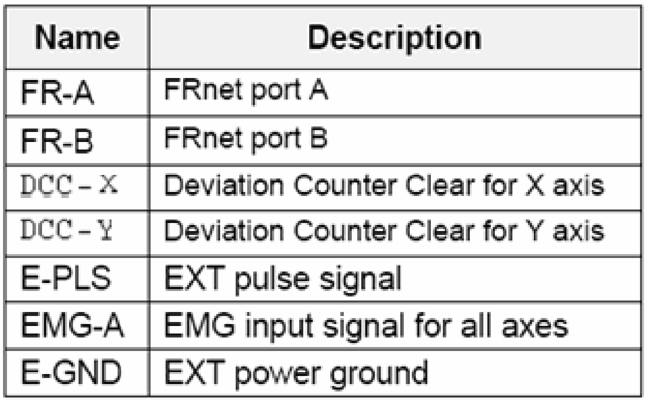


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection



Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-4 shows the pin assignment for the 5-pin connector on the DN-8468FB, and the Table 3-5 shows its I/O connector signal description.

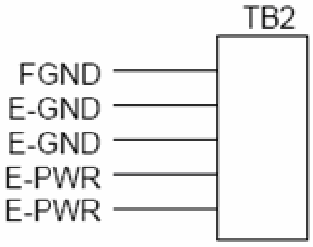
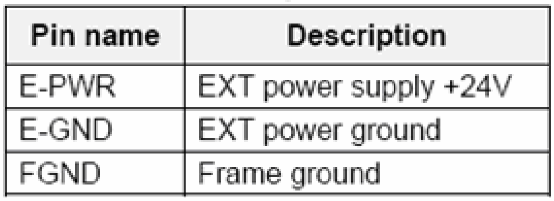


Table 1-5 TB2 Signal Connection



Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

Fig. 1-4 Pin definition for TB2

▶ **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CN-X, CN-Y, CN-Z, CN-U (CN1 connector for each AXIS in Driver)

The connectors CN-X, CN-Y, CN-Z, and CN-U are 26-pin connectors that enable you to connect to the CN1 connector of FUJI FALDIC-W series motor drivers. Fig.3-5 shows the pin assignment for the 26-pin connector on the DN-8468FB, and the Table 3-6 shows its I/O connector signal description.

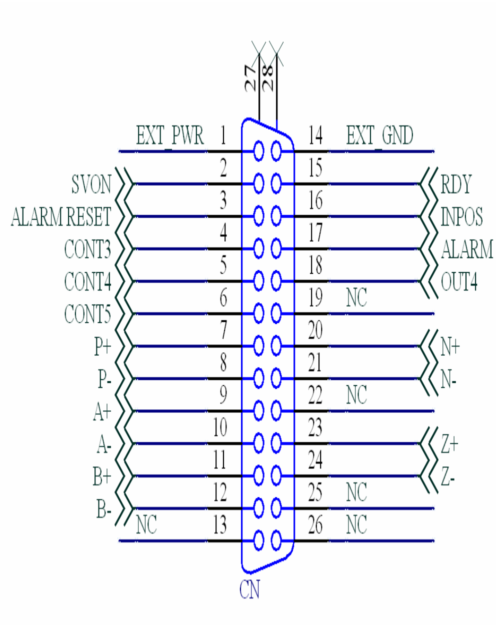


Fig 3-5 Pin definition for CN-X, CN-Y, CN-Z, CN-U

Table 3-6 CN-X ,CN-Y ,CN-Z ,CN-U

Name	No.	Description
EXT_PWR	1	EXT POWER 24V
SVON	2	CONT1 of Servo Motor (default: SVON)
ALARM RESET	3	CONT2 of Servo Motor (default: ALARM RESET)
CONT3	4	CONT3 of Servo Motor
CONT4	5	CONT4 of Servo Motor
CONT5	6	CONT5 of Servo Motor
P+	7	Positive Direction Pulse (+)
P-	8	Positive Direction Pulse (-)
A+	9	Encoder A-phase (+)
A-	10	Encoder A-phase (-)
B+	11	Encoder B-phase (+)
B-	12	Encoder B-phase (-)
NC	13	No connection
EXT_GND	14	EXT POWER Ground
RDY	15	OUT1 of Servo Motor (default: RDY)
INPOS	16	OUT2 of Servo Motor (default: INPOS)
ALARM	17	OUT3 of Servo Motor (default: ALARM)
OUT4	18	OUT4 of Servo Motor
NC	19	No connection
N+	20	Negative Direction Pulse (+)
N-	21	Negative Direction Pulse (-)
NC	22	No connection
Z+	23	Encoder Z-phase (+)
Z-	24	Encoder Z-phase (-)
NC	25	No connection
NC	26	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 12-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-7 shows the pin assignment for the 12-pin connector on the DN-8468FB, and the Table 3-8 shows its I/O connector signal description.

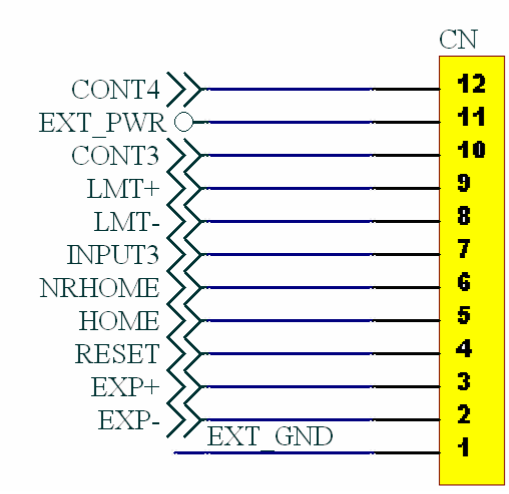

CN
CONT4
EXT_PWR
CONT3
LMT+
LMT-
INPUT3
NRHOME
HOME
RESET
EXP+
EXP-
EXT_GND
12
11
10
9
8
7
6
5
4
3
2
1

Fig 3-7 Pin definition for CN1~ CN4

Table 3-8 CN1~CN4

Name	Number	Description
CONT4	12	CONT4 of Servo Motor
EXT_PWR	11	EXT POWER 24V
CONT3	10	CONT3 of Servo Motor
LMT+	9	Limit switch Input Signal(+)
LMT-	8	Limit switch Input Signal(-)
INPUT3	7	Input Signal (IN3)
NRHOME	6	Near HOME Sensor Input Signal
HOME	5	HOME Sensor Input Signal
RESET	4	RESET Input Signal
EXP+	3	EXT Positive Direction Pulse(+)
EXP-	2	EXT Positive Direction Pulse(-)
EXT_GND	1	EXT POWER Ground

■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468FB, and the Table 3-9 shows its I/O connector signal description.

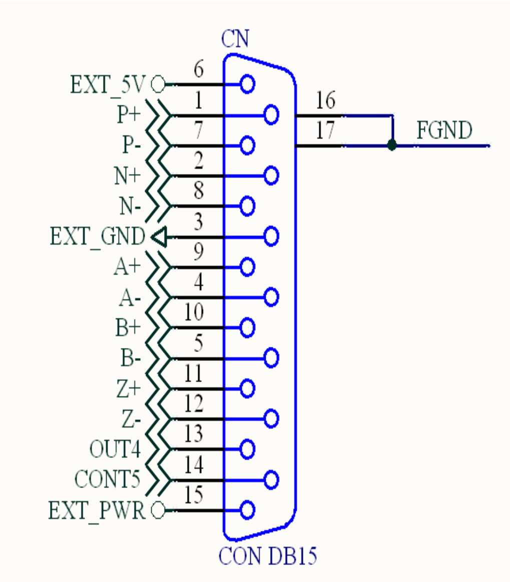


Fig 3-8 Pin definition for CN5~ CN8

Table 3-9 CN5~CN8

Name	Number	Description
P+	1	Positive Direction Pulse(+)
N+	2	Negative Direction Pulse(+)
EXT_GND	3	EXT POWER Ground
A-	4	Encoder A-phase(-)
B-	5	Encoder B-phase(-)
EXT_5V	6	EXT POWER 5V
P-	7	Positive Direction Pulse(-)
N-	8	Negative Direction Pulse(-)
A+	9	Encoder A-phase(+)
B+	10	Encoder B-phase(+)
Z+	11	Encoder Z-phase(+)
Z-	12	Encoder Z-phase(-)
OUT4	13	OUT4 of Servo Motor
CONT5	14	CONT5 of Servo Motor
EXT_PWR	15	EXT POWER 24V

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.3-9 shows the pin assignment for the 8-pin connector on the DN-8468FB, and the Table 3-10 shows its I/O connector signal description.

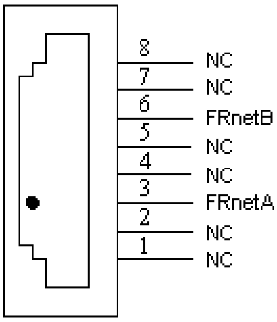


Fig. 3-9 Pin definition for RJ1

Table 3-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

Note: Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.5.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

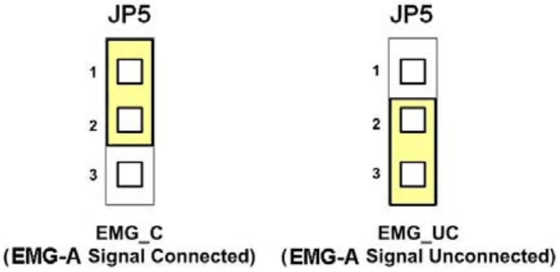

JP5
1
2
3
EMG_C
(EMG-A Signal Connected)
JP5
1
2
3
EMG_UC
(EMG-A Signal Unconnected)

Fig. 3-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

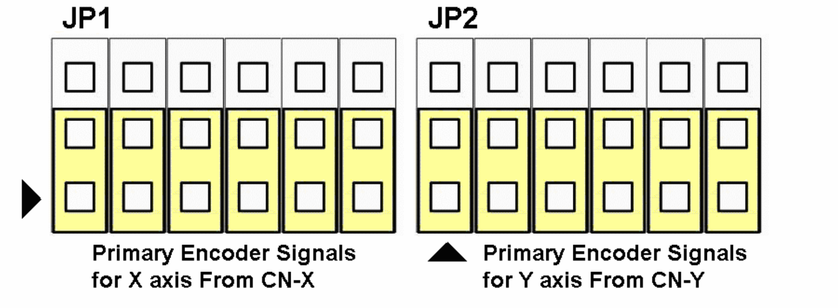

JP1
JP2
Primary Encoder Signals
for X axis From CN-X
Primary Encoder Signals
for Y axis From CN-Y

Fig. 3-11 Primary encoder signals setting

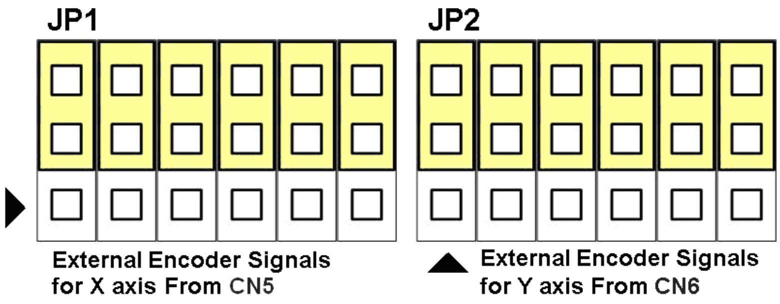

JP1
JP2
External Encoder Signals
for X axis From CN5
External Encoder Signals
for Y axis From CN6

Fig. 3-12 External encoder signals setting

■ SW1

The CONT3 for each servo ampilfier can be selected from SW1. The number 1, 2 , 3, 4 on SW1 are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the CONT3 singals to GND. The CONT3 signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the CONT3 signals can be controlled from CONT3 signals in CN1 ~ CN4.

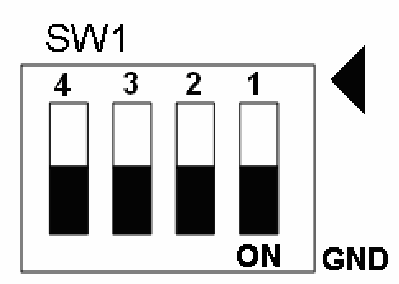


Fig. 3-13 SW1 setting for normally GND (Default setting)

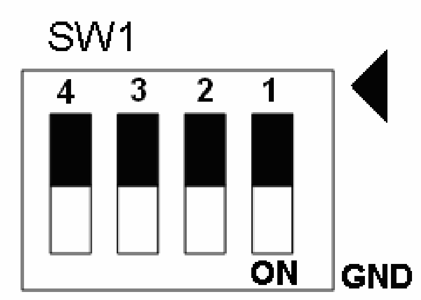


Fig. 3-14 SW1 setting for user controlled signals.